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# REPORT

OF THE

SUDAN MEDICAL SERVICE

FOR THE YEAR

1948



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# SUDAN MEDICAL SERVICE ANNUAL REPORT 1948.

## CONTENTS.

CHAPTER.	PAGE
I. INTRODUCTION .. .. .	1
II. HEALTH OF OFFICIALS .. .. .	2
III. EPIDEMIC DISEASE : .. .. .	3
1. Cerebrospinal Meningitis .. .. .	3
2. Diphtheria .. .. .	3
3. Relapsing Fever .. .. .	4
4. Smallpox .. .. .	5
IV. ENDEMIC DISEASE : .. .. .	
1. Ancylostomiasis .. .. .	6
2. Blackwater Fever .. .. .	6
3. Dracontiasis .. .. .	7
4. Dysenteries .. .. .	8
5. Enteric Fever .. .. .	8
6. Hydatid Disease .. .. .	9
7. Leishmaniasis .. .. .	9
8. Leprosy .. .. .	10
9. Malaria .. .. .	10
10. Rabies .. .. .	12
11. Acute Rheumatism .. .. .	14
12. Schistosomiasis .. .. .	14
13. Trypanosomiasis .. .. .	16
14. Tuberculosis .. .. .	16
15. Tumours .. .. .	19
16. Undulant Fever .. .. .	19
17. Venereal Disease .. .. .	20
18. Yaws .. .. .	20
V. PUBLIC HEALTH : .. .. .	
1. Quarantine .. .. .	21
2. Ante-Natal and Maternity Service .. .. .	22
3. Infant and Child Welfare .. .. .	23

CHAPTER	PAGE
4. School Health .. .. .	24
5. Rural Health .. .. .	29
6. Nutrition .. .. .	29
7. Legislation .. .. .	29
8. Health in Provinces	
(a) Blue Nile .. .. .	29
(b) Darfur .. .. .	31
(c) Equatoria .. .. .	32
(d) Kassala .. .. .	34
(e) Khartoum .. .. .	36
(f) Kordofan .. .. .	37
(g) Northern .. .. .	39
(h) Upper Nile .. .. .	40
(i) Bahr el Ghazal .. .. .	42
VI. PILGRIMAGE FROM THE SUDAN .. .. .	44
VII. MEDICAL WORK OF MISSIONS .. .. .	46
VIII. STARK MEDICAL RESEARCH LABORATORIES : Dr. R. Kirk .. .. .	48
IX. MEDICAL ENTOMOLOGY : Mr. D. J. Lewis .. .. .	57
X. WELLCOME CHEMICAL LABORATORIES : Dr. A. J. Henry .. .. .	60
XI. KITCHENER SCHOOL OF MEDICINE : Dr. R. B. U. Somers.. .. .	63
XII. S.M.S. SCHOOL OF HYGIENE .. .. .	66
XIII. OMDURMAN MIDWIVES' SCHOOL .. .. .	69
XIV. OTHER TRAINING .. .. .	72
XV. S.M.S. GRAPHIC MUSEUM .. .. .	73

## APPENDICES.

TABLE I. STAFF OF THE S.M.S. .. .. .	76
TABLE II. INCOME AND EXPENDITURE OF THE S.M.S. .. .. .	78
TABLE III. INPATIENT STATISTICS .. .. .	79
TABLE IV. OUTPATIENT STATISTICS .. .. .	80
DIAGRAM I. DEATHS IN HOSPITALS AND DISPENSARIES: MORTALITY BY DISEASES .. .. .	81
DIAGRAM II. DEATHS IN HOSPITALS AND DISPENSARIES : FATALITY RATE BY DISEASES .. .. .	82

# CHAPTER I.

## INTRODUCTION.

Although more cases of smallpox occurred than in 1947 the state of Public Health remained satisfactory.

The increase in number of cases of smallpox was mainly due to a flare up in Kordofan, but by extensive vaccination and control measures the incidence decreased throughout the year.

Out of a total of 1,412 cases only 279 were seen in the second half of the year. Cerebrospinal meningitis showed the lowest incidence since 1926, the mortality rate was high due to the sporadic nature of the cases which meant delay in diagnosis and treatment. Fewer cases of relapsing fever occurred than in 1947, the progressive decline in the number of cases continues and it is hoped that by the regular use of D.D.T. dusting powder epidemics of this disease will no longer take place.

No cases of typhus or yellow fever were reported.

The rains generally were better spaced than in 1947 and the overall production of rain grown durra was, therefore, more satisfactory. In one or two areas rains were light and there may be food shortages in these areas next year. Table I shows that progress in curative medicine was maintained, although the number of admissions was smaller than in 1947, one reason for this decrease was the more careful selection of cases for admission to hospitals.

TABLE I.

*Statistics of Treatment in Sudan Hospitals and Dispensaries in the Last Ten Years.*

YEAR								Admissions	Attendances	Operations
1939	..	..	..	..	..	..	..	105,103	7,119,973	11,253
1940	..	..	..	..	..	..	..	104,422	6,649,335	11,139
1941	..	..	..	..	..	..	..	103,023	6,330,711	10,417
1942	..	..	..	..	..	..	..	114,837	6,750,329	11,353
1943	..	..	..	..	..	..	..	112,275	6,796,372	12,726
1944	..	..	..	..	..	..	..	131,077	7,077,919	13,796
1945	..	..	..	..	..	..	..	131,571	7,897,148	15,455
1946	..	..	..	..	..	..	..	126,586	8,474,874	15,509
1947	..	..	..	..	..	..	..	142,294	9,253,351	16,755
1948	..	..	..	..	..	..	..	140,511	9,820,304	17,573

This year Residual Spraying of government employees houses was continued with success in towns in malarious areas.

Steps were taken to inaugurate the method of malarial control by ' Residual Spraying ' in rural areas to cover the next malarial season in a selected part of the Gezira Irrigated Area. Next year it is proposed to spray with D.D.T. wettable powder all houses in four blocks of the Gezira end to reduce larvicidal measures.

Progress in maternity and child welfare work was extended, new centres were opened in Khartoum, Port Sudan, Fasher, Juba, Yei.



Research work was continued on the pox virus diseases, leishmaniasis, tuberculosis and onchocerciasis. Experiments were continued on the infection of sandflies with Kala-Azar parasites.

Attention is drawn to the description in the Stack Medical Research Laboratories of the Monster born in Dongola province.

This Ischiopagus was from external appearances thought to be bisexual when however dissection was carried out it was found that each of the components was of the female sex. Work continues on the toxic principles of Courbonia Virgata, and the method of detecting these in the organs after death, the survey of Sudan seed oils was further extended by the examination of four more varieties of seeds from the Southern Sudan, Hyptis Spicigera, Luffa Cylindrica, Citrullus Vulgaris and Lagenaria Vulgaris.

Preliminary examination of the oil of the seeds of Ammi Visnaga (used as a diuretic in Egypt) was carried out.

Experiments were carried out in Chironomidae control, it was found that an Aqueous suspension of benzine hexachloride was successful in killing the larvae. This was successful in a small scale experiment. It is yet to be seen whether this method of control can be applied to such a large area as exists at the Blue Nile at Khartoum.

## CHAPTER II.

### HEALTH OF OFFICIALS.

The figures for the average number of days sickness for officials of the three nationalities remains satisfactory.

TABLE 2.

*Sudan 1948.*

#### *Health of Officials.*

NATIONALITY	Number of officials employed	Total		Average days sickness		Died	Invalided
		Placed on sick list	No. of days sick	For all officials	For those who were sick		
British .. ..	918	189	1,623	1.77	8.59	—	5
Sudanese .. ..	5,144	1,153	12,144	2.36	10.53	4	8
Egyptian .. ..	271	68	530	1.96	7.79	—	—

## CHAPTER III.

### EPIDEMIC DISEASE.

#### 1. CEREBROSPINAL MENINGITIS.

The incidence of this disease was the lowest since 1926. Cases occurred in every province, and as has been stated before the reason for the high mortality rate was no doubt due to the inevitable delay in diagnosis and treatment owing to the sporadic nature of the attacks.

TABLE 3.

#### *Cerebrospinal Meningitis.*

*Incidence in the last ten years.*

YEAR	No. of cases	No. of Deaths
1939 .. .. .	2,714	647
1940 .. .. .	4,032	796
1941 .. .. .	1,824	459
1942 .. .. .	2,787	1,027
1943 .. .. .	3,526	765
1944 .. .. .	2,346	405
1945 .. .. .	6,166	666
1946 .. .. .	730	155
1947 .. .. .	443	159
1948 .. .. .	170	59

The Distribution by Provinces was :—

PROVINCE	Cases	Deaths
Blue Nilo .. .. .	27	—
Darfur .. .. .	7	4
Equatoria .. .. .	76	29
Kassala .. .. .	2	2
Khartoum .. .. .	4	2
Kordofan .. .. .	4	—
Northern .. .. .	2	2
Upper Nile .. .. .	10	6
Bahr-el-Ghazal .. .. .	38	14
TOTALS .. .. .	170	59

#### 2. DIPHTHERIA.

It is again evident that it is in those provinces with direct connections with other countries and with foreign elements in their population, which have a higher incidence of this disease.

Of the 326 cases reported, 31 cases died.



TABLE 4.

*Diphtheria.**Incidence in the last ten years.*

YEAR	Cases	YEAR	Cases
1939 .. .. .	77	1944 .. .. .	270
1940 .. .. .	114	1945 .. .. .	389
1941 .. .. .	186	1946 .. .. .	390
1942 .. .. .	207	1947 .. .. .	364
1943 .. .. .	309	1948 .. .. .	326

The distribution by Provinces was :—

PROVINCE.	Cases	Deaths
Blue Nile .. .. .	65	—
Darfur .. .. .	7	3
Equatoria .. .. .	3	—
Kassala .. .. .	27	2
Khartoum .. .. .	155	6
Kordofan .. .. .	26	8
Northern .. .. .	40	10
Upper Nile .. .. .	2	2
Bahr el Ghazal .. .. .	1	—
TOTALS .. .. .	326	31

**3 RELAPSING FEVER.**

There was again a big reduction in the incidence of this disease.

The majority of the cases occurred in these provinces which lie along the pilgrim route to the East.

The use of D.D.T. continues to prove of immense help in combating this disease. D.D.T. powder was brought into general use as a delousing agent during 1945 and as can be seen from the table, the number of cases has shown a marked and steady decrease since that year.

TABLE 5.

*Relapsing Fever.**Incidence in the last ten years.*

YEAR	Cases	Deaths
1939 .. .. .	1,006	92
1940 .. .. .	1,487	45
1941 .. .. .	3,028	110
1942 .. .. .	5,287	559
1943 .. .. .	10,505	668
1944 .. .. .	22,672	310
1945 .. .. .	17,392	444
1946 .. .. .	1,952	65
1947 .. .. .	588	67
1948 .. .. .	287	8

The distribution by Provinces was : —

PROVINCE									Cases	Deaths	
Blue Nile	..	..	..	..	..	..	..	..	68	1	
Darfur	..	..	..	..	..	..	..	..	50	1	
Equatoria	..	..	..	..	..	..	..	..	—	—	
Kassala	..	..	..	..	..	..	..	..	19	6	
Khartoum	..	..	..	..	..	..	..	..	24	—	
Kordofan	..	..	..	..	..	..	..	..	31	—	
Northern	..	..	..	..	..	..	..	..	8	—	
Upper Nile	..	..	..	..	..	..	..	..	87	—	
Bahr el Ghazal	..	..	..	..	..	..	..	..	—	—	
TOTALS								..	..	287	8

4. SMALLPOX.

1,412 cases were treated with 131 deaths. This shows an increase over the number of cases treated in 1947. The reasons for this increase was a flare up which began amongst West Africans in El Obeid in Kordofan Province. As is usual with these people many cases were, in the first instance, concealed, and many persons at first evaded vaccination or if vaccinated took steps to nullify the effects of the vaccination.

Stringent measures were taken and the effect of these is apparent when it is stated that only 279 cases were reported in the whole country during the last six months of the year.

TABLE 6.

*Smallpox.*

*Incidence in the last ten years.*

YEAR					Cases	Deaths
1939	..	..	..	..	553	103
1940	..	..	..	..	515	104
1941	..	..	..	..	46	—
1942	..	..	..	..	12	—
1943	..	..	..	..	182	36
1944	..	..	..	..	242	51
1945	..	..	..	..	—	—
1946	..	..	..	..	—	—
1947	..	..	..	..	807	160
1948	..	..	..	..	1,412	131



The distribution by Provinces was :—

PROVINCE	Cases	Deaths
Blue Nile .. .. .	124	4
Darfur .. .. .	8	1
Equatoria .. .. .	10	—
Kassala .. .. .	152	20
Khartoum .. .. .	3	1
Kordofan .. .. .	1,052	99
Northern .. .. .	3	—
Upper Nile .. .. .	33	3
Bahr el Ghazal .. .. .	27	3
TOTALS .. .. .	1,412	131

## CHAPTER IV.

### ENDEMIC DISEASE.

#### 1. ANCYLOSTOMIASIS.

There was no general significant change in the incidence of this disease.

As regards the village pit latrine experiment in the Moru district of Equatoria Province, it was unfortunate that a census of the control area and examination of the people of this area was not carried out.

The re-examination of 1,004 persons from 131 villages (with pit latrines) was completed by the end of March and the following figures were obtained :

1946—47	Ancylostoma	33. 3 percent.	Bilharzia	5. 1 percent.
1948	„	8.14 „	„	1.12 percent

It should be remembered that after the initial survey all persons suffering from Ancylostoma and Bilharzia were treated, although then we have no figures from control village, these figures tend to show that the reinfection rate is low.

#### 2. BLACKWATER FEVER.

The incidence of this disease showed an increase. Paludrine was used more extensively, as a prophylactic against malaria, than formerly, but it is too early to say whether it is effective against all Sudan strains of malaria. It would be premature to attempt to correlate its use with the incidence of Blackwater fever.

Cases during the last seven years have been :—

YEAR	Cases	Deaths
1942 .. .. .	29	11
1943 .. .. .	17	3
1944 .. .. .	11	4
1945 .. .. .	14	2
1946 .. .. .	14	3
1947 .. .. .	4	—
1948 .. .. .	17	5

TABLE 7.

*Blackwater Fever.**Incidence by age and sex in Provinces.*

PROVINCE	MALE		FEMALE		AGE GROUPS IN YEARS.				
	Cases	Deaths	Cases	Deaths	5-15	15-25	25-35	35-45	45-65
Blue Nile .. ..	2	1	2	1	—	—	3	1	—
Equatoria .. ..	2	1	—	—	—	—	—	—	2
Kassala .. ..	1	—	—	—	—	—	—	—	1
Khartoum .. ..	5	—	—	—	—	—	—	—	5
Kordofan .. ..	—	—	1	—	1	—	—	—	—
Northern .. ..	1	—	—	—	—	1	—	—	—
Upper Nile .. ..	3	2	—	—	—	1	1	1	—
TOTAL .. ..	14	4	3	1	1	2	4	2	8

**3. DRACONTIASIS.**

The general incidence of this disease showed little change although there was a marked decrease in Gedaref District, Kassala Province.

In this district in 1947, 320 cases were found whilst in 1948 there were only 38. Stringent measures (including the use of gambusia) had been taken in Gedaref District and it is hoped that it is due to the measures taken which caused this drop in incidence.

The measures taken were :

1. Protection of water supply and filtration of the water drawn through cloth under supervision.
2. Registration of all water carriers.
3. Prohibition of drawing of water from any same designated sources.
4. Inspection and if necessary treatment of all immigrants.
5. Notification of cases of dracontiasis.
6. Introduction of gambusia fish into Hawata pool to control the cyclops.

The distribution by Provinces was :—

PROVINCE	Cases	Deaths
Blue Nile .. ..	64	—
Darfur .. ..	10	—
Equatoria .. ..	1,275	1
Kassala .. ..	46	1
Khartoum .. ..	21	—
Kordofan .. ..	258	1
Northern .. ..	17	—
Upper Nile .. ..	64	—
Bahr el Ghazal .. ..	518	2
	2,273	5



#### 4. DYSENTERIES.

There was no evidence of any significant change in the incidence of the dysenteric diseases.

3,941 cases were admitted to hospital as compared with 3,894 in 1947. Of the 1948 cases, 551 were diagnosed as bacillary, but in many cases the diagnosis was clinical, owing to lack of laboratory facilities.

The remainder were cases of amoebic infection.

#### 5. ENTERIC FEVER.

There was an increase in the incidence of this disease, partly due to a local epidemic in Merowe in Northern Province where 30 cases were reported.

The disease remains endemic in Khartoum and Omdurman.

The distribution by Provinces was :—

PROVINCE									Cases	Deaths
Blue Nile	..	..	..	..	..	..	..	..	43	—
Darfur	..	..	..	..	..	..	..	..	5	1
Equatoria	..	..	..	..	..	..	..	..	5	1
Kassala	..	..	..	..	..	..	..	..	18	2
Khartoum	..	..	..	..	..	..	..	..	50	3
Kordofan	..	..	..	..	..	..	..	..	4	—
Northern	..	..	..	..	..	..	..	..	64	6
Upper Nile	..	..	..	..	..	..	..	..	13	2
Bahr-el-Ghazal	..	..	..	..	..	..	..	..	—	—
TOTALS								..	202	15

TABLE 8.

#### *Enteric Fever.*

*Incidence in the last ten years.*

YEAR							Cases
1939	..	..	..	..	..	..	202
1940	..	..	..	..	..	..	336
1941	..	..	..	..	..	..	129
1942	..	..	..	..	..	..	167
1943	..	..	..	..	..	..	145
1944	..	..	..	..	..	..	199
1945	..	..	..	..	..	..	183
1946	..	..	..	..	..	..	116
1947	..	..	..	..	..	..	144
1948	..	..	..	..	..	..	202

## 6. HYDATID DISEASE.

Cases continue to occur amongst the Taposa living in Kapoeta District, Equatoria province.

## 7. LEISHMANIASIS.

460 cases were reported with 62 deaths, this shows an increase over the number of cases found in 1947.

The most marked increase occurred in Gedaref District of Kassala Province the cases coming from the old known localities.

Sodium Antimony gluconate was still extensively used with a fair degree of success, it is possible that the better results occurring from the exhibition of this drug may have attracted more sufferers from the disease into Gedaref hospital.

TABLE 9.

### *Leishmaniasis.*

*Incidence in the last ten years.*

YEAR	Cases	YEAR	Cases
1939 .. .. .	394	1944 .. .. .	201
1940 .. .. .	460	1945 .. .. .	192
1941 .. .. .	494	1946 .. .. .	246
1942 .. .. .	432	1947 .. .. .	327
1943 .. .. .	225	1948 .. .. .	460

TABLE 10.

### *Visceral Leishmaniasis : Distribution by Provinces.*

PROVINCE	MALE		FEMALE		AGE GROUPS IN YEARS.					
	Cases	Deaths	Cases	Deaths	1-5	5-15	15-25	25-35	35-45	45-65
Blue Nile .. ..	70	11	5	1	1	10	24	32	4	4
Darfur .. .. .	5	—	—	—	—	2	2	1	—	—
Equatoria .. ..	24	1	6	—	2	14	10	4	—	—
Kassala .. .. .	257	34	53	8	35	92	82	74	19	8
Khartoum .. ..	8	3	—	—	—	—	6	1	1	—
Kordofan .. ..	11	—	10	—	—	6	13	2	—	—
Northern .. ..	4	—	—	—	—	—	1	2	1	—
Upper Nile .. ..	6	4	1	—	—	1	2	2	2	—
Bahr El Ghazal ..	—	—	—	—	—	—	—	—	—	—
TOTALS .. .. .	385	53	75	9	38	125	140	118	27	12

The racial distribution of these cases was :

Sudanese (Arab) 157, Sudanese (Negroid) 107, Ab ssinian 21, West Africans 166, Egyptians 2 and Eritreans 8.



TABLE 11.

*Leishmaniasis : Results of treatment in the last six years.*

YEAR	Apparently cured %	Died %	Still under treatment %	Untreated or Lost sight of %
1943 .. ..	41.0	25.0	20.0	13.5
1944 .. ..	43.0	30.0	2.0	25.0
1945 .. ..	49.0	24.0	15.0	12.0
1946 .. ..	74.4	7.3	11.1	7.2
1947 .. ..	68.4	18.4	10.6	2.6
1948 .. ..	66.5	14.7	6.4	12.4

**8. LEPROSY.**

Although the number of total known cases shows an increase, there is probably no significant change in the incidence of this disease.

The village leper settlement policy continues in Equatoria Province, unfortunately the number of B.E.L.R.A. leprosy layworkers has again been reduced to one.

The survey of the Moru area continues.

TABLE 12.

*Leprosy : Distribution in the Sudan.*

PROVINCE	Total known Cases	Total in settlement		Bacteriologically positive. New found during the year
		Govern- ment	Mission	
Blue Nile .. ..	186	51	—	28
Darfur .. ..	43	36	—	16
Equatoria .. ..	8,447	871	87	229
Kassala .. ..	59	24	—	14
Khartoum .. ..	47	—	8	21
Kordofan .. ..	1,651	110	—	32
Northern .. ..	19	—	—	5
Upper Nile .. ..	7	—	—	5
Bahr el Ghazal .. ..	194	155	—	45
TOTALS .. ..	10,653	1,247	95	395

**9. MALARIA.**

There is nothing new to say about the incidence of this disease. The use of D.D.T. in oil as a larvicide was brought into more general use.

Investigations were begun in the proposed use of ' Residual Spraying ' in rural areas as an imagocide, as a method of malarial control.

The filed experiment in the effectiveness of Paludrine was brought to a conclusion early in the year. A similar experiment was begun towards the end of the year, but in this one Paludrine was exhibited three times a week instead of twice weekly as in the first experiment.

Kosti lies on the River White Nile, 200 miles south of Khartoum and has a population of about 17,000. Malaria is endemic and the falciparum type predominates.

The experiment was carried out amongst schoolboys, school girls, and hospital staff; the individuals from these schools and hospitals were split up into five units, and each unit was divided into three groups, the total number of each group was approximately 210 persons. The three groups were the Paludrine group, the Mepacrine group and the Control group. Before the exhibition of any drugs, spleen was palpated, blood slides were taken, and results were recorded. The exhibition of Mepacrine, to the Mepacrine group was started one week ahead of the other two groups.

#### *Dosage Used.*

*Paludrine.* .05 of a gramme twice weekly for children aged 7—15 years and .1 of a gramme twice weekly for those who were 16 years and older.

*Mepacrine.* .05 of a gramme daily except Fridays for children of the 7-15 years age group and .1 gramme daily except Fridays for those after the age of 15.

*Control.* Sodium Bicarbonate pills were issued twice weekly on the Paludrine days to the control group.

The experiment went on under medical supervision and drugs were given personally by the hospital staff who saw that the individuals took them. Daily supervision was practised and those complaining of fever or other symptoms of malaria had their blood examined. The positive cases were recorded and the individuals were taken out from the experiments. One and a half months from the date of the exhibition of these drugs, another general spleen palpation was carried out and blood slides were taken and examined. At the end of the fourth month of the experiment, a third examination in spleens and blood slides was carried out and the experiment ended. After the second examination certain persons disappeared and were not traceable, these were not considered in the final results.

The results were summarised as follows:—

#### *Paludrine*

No.	Age Groups	No. Malaria Cases	Type	%
181	7-15 years	14	M.T.	7.7
29	16 years and above	1	M.T.	3.3
210		15	M.T.	7.1



*Mepacrine.*

No.	Age Groups	No. Malaria	Cases Type	%
184	7-15 years	47	M.T.	25.5
26	16 years and above	4	„	15.4
210		51	„	24.3

*Controls.*

190	7-15 years	81		42.6
18	16 years and above			

The following list shows number of slides examined and infections found in Kosti hospital during the period the experiment was going on :

MONTH				No. Slides Examined	Malaria Postive Slides
November 1947	..	..	..	588	330
December 1947	..	..	..	611	333
January 1948	..	..	..	501	286
February 1948	..	..	..	758	506

The experiment was repeated at the end of 1948 and went on into the early months of 1949. This will be discussed in the 1949 annual report.

Admissions to, and deaths in, hospitals by provinces were :—

PROVINCE							Admissions	Deaths
Blue Nile	..	..	..	..	..	..	3,053	60
Darfur	..	..	..	..	..	..	795	8
Equatoria	..	..	..	..	..	..	1,890	35
Kassala	..	..	..	..	..	..	1,257	39
Khartoum	..	..	..	..	..	..	1,205	9
Kordofan	..	..	..	..	..	..	2,128	25
Northern	..	..	..	..	..	..	1,193	10
Upper Nile	..	..	..	..	..	..	382	5
Bahr el Ghazal	..	..	..	..	..	..	643	5
TOTALS	..	..	..	..	..	..	12,546	196

## 10. RABIES.

1,166 received anti-rabic vaccine inoculations. In many cases this treatment was given as a precautionary measure, it being often impossible to verify if the 'biting' animal was or was not rabid.

11 deaths from human hydrophobia were reported. It is probable that most of these cases had inadequate or no preventive inoculations.



TABLE 13.

*Rabies and Anti-Rabic Inoculations : Cases Recorded in the Last ten Years.*

YEAR					Persons treated	Total Deaths
1939	..	..	..	..	422	16
1940	..	..	..	..	352	3
1941	..	..	..	..	407	14
1942	..	..	..	..	398	11
1943	..	..	..	..	358	7
1944	..	..	..	..	272	4
1945	..	..	..	..	63	8
1946	..	..	..	..	1,011	17
1947	..	..	..	..	127	8
1948	..	..	..	..	1,166	10

TABLE 14.

*Human Rabies : Details of Cases.*

LOCALITY	Age	Sex	Biting Animal	Site of Bite	Severity of bite	No. of days after bite when treatment was begun	No. of injections given	No. of days from bite to fatal termination
KASSALA PROV. Kassala ..	8	M	Dog	Mouth forearm and chest	Fairly severe	One day	12	42
KORDOFAN. Nahud ..	48	F	Dog	Scalp	Severe	42	—	42
Muglad ..	28	M	„	Leg	„	Uncertain	—	Uncertain
Abbassia ..	25	F	„	Leg	Slight	No treatment	—	One year
BLUE NILE. Medani ..	40	M	Dog	Face	Severe	—	—	60
Atra ..	22	M	„	Leg.	„	One day	3	30
Hag Abdalla	35	F	„	„	Slight	—	—	75
Gulli ..	27	M	„	„	Fairly	—	—	120
KHARTOUM. Omdurman	35	F	Dog	Face	?	2 days	—	60
DARFUR. Kabkabia ..	9	M	Dog	Leg.	Deep	„ „	12	41

## 11. ACUTE RHEUMATISM.

No significant change occurred in the incidence of this disease.

TABLE 15.

### *Acute Rheumatism.*

*Incidence in the last ten years.*

YEAR				Admissions	Deaths
1939	..	..	..	303	4
1940	..	..	..	223	3
1941	..	..	..	356	1
1942	..	..	..	136	—
1943	..	..	..	190	3
1944	..	..	..	281	2
1945	..	..	..	280	2
1946	..	..	..	196	2
1947	..	..	..	216	3
1948	..	..	..	203	1

The distribution by provinces was :—

PROVINCE				Cases
Blue Nile	..	..	..	28
Darfur	..	..	..	8
Equatoria	..	..	..	33
Kassala	..	..	..	12
Khartoum	..	..	..	26
Kordofan	..	..	..	17
Northern	..	..	..	60
Upper Nile	..	..	..	1
Bahr el Ghazal	..	..	..	18
				203

## 12. SCHISTOSOMIASIS.

It must be accepted that the incidence of this disease is slowly increasing in irrigated areas. More extensive surveys now in progress in the Gezira Irrigated Area showed an average rate of 8 per cent. infection with *S. haematobium* out of 22,609 examined. In children the rate was 13 per cent. In the rectal form of the disease there is also an increase, no less than 10 per cent. of 8,538 children examined were found to be suffering from it. In the White Nile Reservoir area the incidence of the vesical disease is much the same as in the Gezira though the rectal type is still much lower. Treatment of discovered cases is being done as the survey progresses, and villages are being resurveyed after treatment. Results of these resurveys have been encouraging. Out of 212 cases only 46 were found to be infected ten months later. Treatment of canals with copper sulphate is done at the same time as the survey of the population. Surveys of the canals before and after treatment showed a considerable reduction in the snail population. In two of the canals after treatment no snails at all were found in 30 dips. while prior to sulphation the figures were 39 and 36.



TABLE 16.

*Schistosomiasis in the Indigenous Population.*  
*Gezira Irrigated Area: Percentage of Incidence.*

(Figures from Routine Examinations of Natives)

YEAR	No.	GROUPS			Infants	%
		CHILDREN Infants	%	ADULTS No. Exmd		
<i>S. Haematobium.</i>						
1946 .. ..	18,728	567	3.02	35,870	430	1.2
1947 .. ..	11,203	351	3.1	17,830	374	2.0
1948 .. ..	8,538	1,124	13.0	14,071	680	5.0
<i>S. Mansoni.</i>						
1946 .. ..	8,369	151	1.8	24,155	336	1.4
1947 .. ..	3,367	166	4.9	9,763	300	3.0
1948 .. ..	8,538	878	10.0	14,071	536	3.8

TABLE 17.

*White Nile Reservoir—Bilharizia Mansoni.*

	Exam.	<i>Haematobium</i>		Exam.	<i>Mansoni</i>	
		Inf.	%		Inf.	%
Dueim and Kosti .. ..	9,010	855	9.4	3,226	86	2.6

In Northern Province although the figures for this year show a decrease it is not considered that this is a true picture. Examinations of school children in Wadi Halfa area show an incidence of the vesical disease of from 14 per cent. to 27 per cent. While sub-grade schools and Khalwas in Merowe district show 10 per cent. Except in Atbara area the rectal form is not common.

TABLE 18.

*Northern Province: Dongola and Merowe Districts: Schistosomiasis  
 Haematobium.*

YEAR	Examined	Infected	Percentage
1946 .. ..	12,124	925	7.6
1947 .. ..	9,539	791	8.3
1948 .. ..	3,642	105	2.9

TABLE 19.

*Schistosomiasis.**Halfa District: Incidence of S. Haematobium Infection.*

YEAR	No. Examined	Infections found	Percentage
1946 .. .. .	5,455	1,110	20.0
1947 .. .. .	10,795	1,785	16.5
1948 .. .. .	8,136	900	11.0

**13. TRYPANOSOMIASIS.**

75 cases were reported in Equatoria Province compared with 47 cases in 1947.

The increased incidence occurred in Source Yubo and Yambio districts.

305,790 palpations were carried out during the year and 3,681 gland punctures were performed.

*Incidence during last ten years.*

YEAR	Yubo	Yambio	Yei	Kajo-Kaji	Meridi	Imported	Other Localities.
1939 .. ..	103	—	—	4	—	—	—
1940 .. ..	80	—	—	—	—	1	—
1941 .. ..	69	—	—	1	47	8	—
1942 .. ..	48	—	—	2	25	—	—
1943 .. ..	60	—	8	1	9	3	—
1944 .. ..	37	—	35	—	4	—	4
1945 .. ..	16	1	19	—	—	—	3
1946 .. ..	21	19	16	—	—	—	—
1947 .. ..	18	6	21	—	2	—	—
1948 .. ..	32	23	20	—	—	—	—

The results of D.D.T. ' Residual Spraying ' the screens at the end of rod-clearing were not conclusive.

As far as Sleeping Sickness is concerned the results of the resettling the Zande must be carefully watched. An increased incidence may possibly occur following on this resettlement.

**14. TUBERCULOSIS.**

The following table shows the admissions to hospitals for the Pulmonary and Non-Pulmonary forms of tuberculosis during the last ten years. It will be noted that the gradual increase in incidence is being maintained. Admissions to dispensaries and isolation hospitals are excluded from the table.



TABLE 20.

YEAR	Pulmonary	Non-Pulmonary	Total
1939 .. ..	685	396	1,081
1940 .. ..	579	457	1,036
1941 .. ..	631	511	1,142
1942 .. ..	671	505	1,192
1943 .. ..	593	529	1,122
1944 .. ..	796	632	1,428
1945 .. ..	957	642	1,600
1946 .. ..	888	613	1,501
1947 .. ..	877	599	1,476
1948 .. ..	1,019	604	1,623

TABLE 21.

*Admissions to Hospitals in the last Five Years Contrasted for the Northern and Southern Regions.*

	1944		1945		1946		1947		1948	
	Pul.	Non-Pul.	Pul.	Non-Pul.	Pul.	Non-Pul.	Pul.	Non-Pul.	Pul.	Non-Pul.
Northern Sudan ..	677	526	845	508	781	538	682	469	768	466
Southern Sudan ..	119	106	112	135	107	75	152	87	190	105
West Africans ..	—	—	—	—	—	—	43	43	61	33

TABLE 22.

*Pulmonary Tuberculosis.*

*Analysis by Age-Group of Hospital Admissions.*

Part of Country.	AGE GROUPS IN YEARS															
	1-5		5-15		15-25		25-35		35-45		45-65		65 & over		Total	
	C	D	C	D	C	D	C	D	C	D	C	D	C	D	C	D
Northern Sudan ..	6	-	24	3	173	15	286	46	177	24	82	14	20	1	768	103
Southern Sudan ..	1	-	5	1	51	9	79	14	39	4	14	-	1	-	190	27
West Africans ..	-	-	5	2	11	4	27	10	14	6	3	1	1	-	61	25

TABLE 23.

*Analysis by Occupation of Admissions to Hospitals in the last Six Years*

YEAR	Prisoners	Cultivators	Nomads	Soldiers Sailors and Police	Townsmen.			Servants	Indigent and Unemployed	Women not employed	Children	Unclassified	TOTAL
					Day Labourers	Artisans and Shop-keepers	Clerical						
1943 .. ..	21	129	—	25	113	44	12	31	113	81	3	21	593
1944 .. ..	—	171	—	47	132	25	25	15	165	159	12	45	796
1945 .. ..	—	191	7	41	159	65	21	25	170	197	25	56	957
1946 .. ..	—	216	35	40	66	40	23	34	175	172	11	76	888
1947 .. ..	16	245	8	27	129	51	20	26	95	153	14	93	877
1948 .. ..	38	321	—	34	103	49	32	12	170	205	24	31	1,019

TABLE 24.

*Non-Pulmonary Tuberculosis.*

Part of Country.	AGE GROUPS IN YEARS.								TOTAL
	0-1	1-5	5-15	15-25	25-35	35-45	45-65	65 & over	
Northern Sudan ..	9	46	63	97	128	65	35	23	466
Southern Sudan ..	—	5	17	17	29	27	7	3	105
West Africans ..	—	—	4	5	9	9	4	6	33

TABLE 25.

*Non-Pulmonary Tuberculosis.**1948 Analysis by Site of Lesion of Hospital Admissions*

Part of Country	Gland	Bone	Joint	Other	TOTAL
Northern Sudan ..	146	164	50	106	466
Southern Sudan ..	38	31	22	14	105
West Africans ..	6	16	6	5	33

## 15. TUMOURS.

Recorded cases number 613 and were classified as follows :—

Malignant : Carcinoma	..	..	..	..	157
Malignant sarcoma	..	..	..	..	62
Undifferentiated	..	..	..	..	96
					<hr/>
					315
Benign	..	..	..	..	298
					<hr/>
Total	..	..	..	..	613

TABLE 26.

*Tumours.*

*Incidence in the last six years.*

NORTHERN SUDAN.

YEAR									Malignant	Non-Malignant	TOTAL
1943	..	..	..	..	..	..	..	..	291	457	748
1944	..	..	..	..	..	..	..	..	217	664	881
1945	..	..	..	..	..	..	..	..	211	280	491
1946	..	..	..	..	..	..	..	..	189	295	484
1947	..	..	..	..	..	..	..	..	196	241	437
1948	..	..	..	..	..	..	..	..	272	241	513

SOUTHERN SUDAN.

1943	..	..	..	..	..	..	..	..	6	34	40
1944	..	..	..	..	..	..	..	..	20	96	116
1945	..	..	..	..	..	..	..	..	70	107	177
1946	..	..	..	..	..	..	..	..	51	210	261
1947	..	..	..	..	..	..	..	..	37	90	127
1948	..	..	..	..	..	..	..	..	43	57	100

## 16. UNDULANT FEVER.

51 cases were reported with one death as contrasted with 51 cases and two deaths in 1947.

TABLE 27.

*Undulant Fever.*

*Incidence in the last ten years.*

Year.				Cases	Year				Cases
1939	..	..	..	29	1944	..	..	..	66
1940	..	..	..	43	1945	..	..	..	70
1941	..	..	..	31	1946	..	..	..	58
1942	..	..	..	17	1947	..	..	..	70
1943	..	..	..	55	1948	..	..	..	51



## 17. VENEREAL DISEASE.

131,304 cases were reported with 47 deaths as compared with 129,427 and 59 deaths in 1947.

There is nothing new to add about the incidence of these diseases. The distribution by Provinces was.

PROVINCE.						Cases.
Blue Nile	..	..	..	..	..	24,665
Darfur	..	..	..	..	..	23,082
Equatoria	..	..	..	..	..	8,406
Kassala	..	..	..	..	..	13,301
Khartcum	..	..	..	..	..	10,114
Kordofan	..	..	..	..	..	27,001
Northern	..	..	..	..	..	6,812
Upper Nile	..	..	..	..	..	15,538
Bahr el Ghazal	..	..	..	..	..	2,385
TOTAL					.. ..	131,304

## 18. YAWS.

There is no evidence of any change of incidence in this disease in the Southern Sudan.

## CHAPTER V.

### PUBLIC HEALTH.

#### 1. QUARANTINE.

20,714 persons entering the Sudan at Wadi Halfa were examined. The following cases of disease were found amongst them :—

Schistosomiasis	..	..	..	..	288
Malaria	..	..	..	..	5
Relapsing Fever	..	..	..	..	8
Amoebic Dysentery		..	..	..	2
T.B.	..	..	..	..	3
Chickenpox	..	..	..	..	27
Measles	..	..	..	..	1

Labourers imported by contractors were medically examined, deloused, vaccinated and, if proceeding south of latitude 15° N., inoculated against yellow fever. Cases of schistosomiasis were detained in the Quarantine for treatment. All trains, boats, and road vehicles arriving in Halfa from the South were inspected before entering the town.

The *Aedes* index for Halfa was maintained at nil throughout the year and *A. gambie* control measures have eradicated this mosquito from the Halfa area.

The Port Quarantine Service dealt with 765 ships entering Port Sudan and 707 native craft entering Flamingo Bay. Eleven arrived at Port Sudan after a voyage of less than 6 days from a port in the yellow fever endemic area and the required measures were taken against these ships. No mosquitoes were found on board and no ship carried any case of communicable diseases.

174 dhows were fitted with 317 mosquito proof fresh water containers and thereby reduced considerably the possibility of importing *aedes aegypti* mosquitoes into the area.

The two ship searchers inspected 490 ships for rats and mosquitoes. No unusual rat mortality was found in ships coming from plague infected ports. The system of radio pratique in abeyance during the war was re-instituted in 1947.

The quarantine service at Suakin dealt with 2,011 Sudanese and 9,094 Westerners going on the pilgrimage. These 11,105 pilgrims left in September and October. All pilgrims were deloused with D.D.T. powder, inoculated against cholera and vaccinated against smallpox.

The pilgrimage was declared clean and the period of detention in the Quarantine for returning pilgrims fixed at 24 hours in Suakin. The Sudan Medical Mission accompanied the pilgrimage.

Measures to combat the transport of mosquitoes by air, land, river or seacraft were carried out as in previous years at Wadi Halfa, Port Sudan, Khartoum, Malakal Juba, El Obeid, El Fasher and Geneina.



### TYPE OF CRAFT.

	LAND		SEA OR RIVER		AIR	
	Total Insp.	No. of Adult Mosq. found	Total Insp.	No. of Adult Mosq. found	Total Insp.	No. of Adult Mosq. found
Wadi Halfa ..	350	0	6902	0	399	0
Port Sudan ..	—	—	488	0	240	0
Khartoum ..	All trains from south	15	1661	10	1734	0
Malakal ..	—	—	352	0	573	0
Juba .. ..	—	—	69	1	1115	0
Kosti .. ..	—	—	—	—	—	—

### 2. ANTI-NATAL AND MATERNITY SERVICE.

At Kassala Hospital ante-natal clinic 268 new cases were seen and of these 121 were found to need treatment (albuminaria 51, malaria 25, anaemia 18, Toxaemia of pregnancy 8, Amoebic Dysentery 6, and hepatitis 13). Cases admitted to hospital for labour were 28, and of these one died—she had not attended the ante-natal clinic.

At Port Sudan 265 new cases were seen in the four Clinics. In Kordofan Province, at the El Obeid clinic 3,729 new cases were seen. At Nahud clinic 1,625 new cases were seen, compared with 237 in 1946. At the 12 S.M.S. ante-natal clinics in Khartoum Province 5,377 new cases were seen contrasted with 4,336 in 1947.

A volunteer Welfare Centre was started in November at Yei in Equatoria and appears to be popular.

31 midwives passed out of the Midwives' Training School Omdurman, and returned to their villages in the following provinces.

Blue Nile Province .. .. .	8
Kassala Province .. .. .	6
Khartoum Province .. .. .	5
Kordofan Province .. .. .	2
Northern Province .. .. .	2
Darfur Province .. .. .	6
Upper Nile Province .. .. .	2

### 3. INFANT AND CHILD WELFARE.

14,366 attendances at clinics and home visits of which 5,877 were new cases, were reported from S.M.S. Child Welfare clinics in the Khartoum Area, of these 7652 were home visits.

The infantile mortality per 1000 live births in Khartoum and Omdurman was :—

				1947	1948
Khartoum	..	..	..	73	86
Omdurman	..	..	..	45	38

In Khartoum Province S.M.S. Welfare centres were maintained at the Omdurman Midwives' School, at the Morada, in East and West Deims, Khartoum North, Kobar, Burri, Tuti Island, Halfayat el Meluk, Shambat, Deim Abu Said and Church Missionary Society Centres at C.M.S. Hospital, at Abu Ruf, Beit El Mal, Wad Nubawi and Abu Kaduk.

TABLE 28.

*Khartoum Province : 1948.*

*Infants and Children seen at Child Welfare Centres and by Home Visitors.*

CENTRE						Seen at Centre		Total	Referred to Hospital
						New Cases	Old Cases		
Khartoum	..	..	..	..	..	222	325	547	
Omdurman	..	..	..	..	..	465	2171	2636	
East Deims	..	..	..	..	..	280	908	1188	
West Deims	} Khartoum					538	1471	2009	
Khartoum North						259	836	1095	
Kobar	..	..	..	..	..	44	170	214	
Burri	..	..	..	..	..	82	158	240	
Tuti Island	..	..	..	..	..	105	256	361	
Halfayat el Meluk	..	..	..	..	..	81	230	311	
Shambat	..	..	..	..	..	60	104	164	
Deim Abu Said	..	..	..	..	..	66	300	366	
TOTALS						2202	6929	9131	

A total of 987 cases were referred to an obstetrician.



### Home Visits—S.M.S.

AREA								No. of Homes	No. of Visits
Khartoum	..	..	..	..	..	..	..	1,023	1,213
Omdurman	..	..	..	..	..	..	..	1,932	3,726
Khartoum Deims	..	..	..	..	..	..	..	1,538	1,863
Khartoum North	..	..	..	..	..	..	..	365	398
Rural District	..	..	..	..	..	..	..	377	452
TOTALS								5,235	7,652

### Church Missionary Society Child Welfare Centres.

CENTRES						Children seen at Home	Children seen at Clinic	TOTAL
Abu Ruf	..	..	..	..	..	734	698	1,432
Beit El Mal	..	..	..	..	..	659	474	1,133
Wad Nubawi	..	..	..	..	..	718	430	1,148
Hospital	..	..	..	..	..	1,481	1,009	2,490
Abu Kaduk	..	..	..	..	..	748	6,036	6,784
TOTALS ..						4,340	8,647	12,987

### Summary of Work Done by S.M.S., Child Welfare Service and by the Church Missionary Society.

CENTRE						Home Visits	Visits to Centres	TOTALS
Sudan Medical Service	..	..	..	..	..	7,652	9,131	16,783
Church Missionary Society	..	..	..	..	..	4,340	8,647	12,987
TOTALS						11,992	17,778	29,770

### 4. SCHOOL HEALTH.

Table 29 gives figures for the examination of school children in each province. No significant changes in the health of pupils were found.

TABLE 29.

*Health of Sudanese School Children.*

PROVINCE AND DISTRICT.	No. Exam- ined %	Trach- oma %	Bilhar- zia %	Spleen %	Pul. T.B. %	Ankylos- tomiasis %
<b>Bahr-el-Ghazal.</b>						
3 Boys Elementary .. ..	327	8	30	115	—	40
<b>Blue Nile.</b>						
WAD MEDANI AREA.						
1 Boys Secondary .. ..	346	127	4	10	—	—
2 Boys Intermediate .. ..	490	182	4	41	—	—
Girls Intermediate .. ..	99	42	5	—	—	—
24 Boys Elementary .. ..	3,573	1,020	121	439	—	33
6 Girls Elementary .. ..	394	157	12	75	—	1
4 Sub-Grade .. ..	197	42	—	46	—	—
ABU USHER.						
2 Boys Intermediate .. ..	321	46	2	12	—	—
Boys Elementary .. ..	1,512	185	15	79	—	—
Girls Elementary .. ..	589	36	2	25	—	—
Sub-Grade and Khalwas ..	1,647	289	50	300	—	—
SENNAR.						
2 Boys Elementary .. ..	189	166	1	188	—	—
2 Girls Elementary .. ..	565	156	22	73	—	—
7 Village Schools .. ..	3,346	909	86	1,083	—	—
SINGA.						
4 Boys Elementary .. ..	655	16	—	68	—	—
3 Girls Elementary .. ..	251	7	—	20	—	—
7 Village Schools .. ..	506	69	42	209	—	—
ROSEIRES.						
1 Boys Elementary .. ..	125	23	1	47	—	—
1 Girls Elementary .. ..	90	12	—	20	—	—
6 Sub-Grade .. ..	305	33	—	191	—	—
KOSTI.						
4 Boys Elementary .. ..	737	161	9	120	—	—
2 Girls Elementary .. ..	226	63	—	21	—	—
17 Sub-Grade and Khalwas ..	1,295	317	76	263	—	—
DUEIM.						
1 Bakht el Ruda Training College	236	97	13	5	—	—
1 Junior Secondary .. ..	41	5	4	—	—	—
1 Rural Intermediate .. ..	155	45	21	7	—	—
9 Boys Elementary .. ..	1,607	542	22	235	—	—
4 Girls Elementary .. ..	421	73	—	25	—	—
4 Sub-Grade and Khalwas ..	181	43	—	44	—	—
<b>Darfur.</b>						
EL FASHER.						
1 Boys Intermediate .. ..	153	32	41	38	—	—
1 Boys Elementary .. ..	398	161	119	70	—	—
1 Girls Elementary .. ..	124	29	1	7	—	—
Sub-Grade and Khalwas ..	566	215	109	106	—	—



PROVINCE AND DISTRICT.	No. Exam- ined %	Trach- oma %	Bilhar- zia %	Spleen %	Pul. T.B. %	Ankylos- tomiasis %
<b>Darfur—Contd.</b>						
<b>ZALINGEI.</b>						
1 Boys Elementary .. ..	193	65	12	102	—	—
1 Girls Elementary .. ..	82	50	—	45	—	—
9 Sub-Grade .. ..	663	144	23	179	—	—
<b>KUTTUM.</b>						
1 Boys Elementary .. ..	145	89	5	41	—	—
3 Sub-Grade .. ..	107	47	1	75	—	—
<b>UM KEDDADA.</b>						
1 Boys Elementary .. ..	166	41	—	85	—	—
1 Girls Elementary .. ..	62	13	—	23	—	—
5 Sub-Grade .. ..	296	116	7	117	—	—
<b>GENEINA.</b>						
1 Boys Elementary .. ..	133	35	17	45	—	5
1 Girls Elementary .. ..	72	24	4	19	—	—
<b>NYALA.</b>						
1 Boys Elementary .. ..	268	18	102	46	—	—
1 Girls Elementary .. ..	91	11	4	7	—	—
8 Sub-Grade .. ..	757	151	204	354	—	—
<b>Equatoria.</b>						
<b>CENTRAL DISTRICT.</b>						
Juba .. ..	64	7	3	10	—	7
<b>YEI DISTRICT.</b>						
Loka .. ..	125	6	17	36	1	19
Yei (Boys) .. ..	170	4	44	31	—	29
Yei (Girls) .. ..	105	7	18	38	—	16
<b>MORU.</b>						
Meridi .. ..	133	4	34	67	—	26
Lui .. ..	232	19	11	53	—	20
<b>TORIT.</b>						
Okaru .. ..	168	10	—	24	—	10
Palotaka .. ..	221	38	—	36	—	23
Loa .. ..	234	5	5	31	—	12
Torit .. ..	201	8	2	58	—	18
Isoke .. ..	132	21	—	31	—	7
<b>ZANDE.</b>						
Ubu .. ..	231	—	22	125	—	18
Mupoi .. ..	231	—	35	134	—	25
Chief Dika (Boys) .. ..	95	—	4	43	—	18
„ „ (Girls) .. ..	38	2	1	31	—	4
Legi Rikita (Boys) .. ..	91	2	—	81	—	—
„ „ (Girls) .. ..	30	—	—	30	—	—
Ndoroma (Boys) .. ..	25	—	—	24	—	—
<b>EASTERN.</b>						
Nalingaro .. ..	76	16	—	25	—	—



PROVINCE AND DISTRICT.			No. Exam- ined %	Trach- oma %	Bilhar- zia %	Spleen %	Pul. T.B. %	Ankylos- tomiasis %
<b>Kassala.</b>								
(a) KASSALA AREA.								
2 Boys Intermediate	..	..	128	4	—	29	—	—
6 „ Elementary	..	..	871	137	7	132	—	—
16 Sub-Grade	..	..	598	128	—	109	—	—
(b) GEDAREF AREA.								
2 Boys Intermediate	..	..	150	79	—	11	—	—
7 Boys Elementary	..	..	958	401	7	263	—	—
2 Girls Elementary	..	..	146	83	—	32	—	—
9 Sub-Grade	..	..	492	188	8	135	—	—
(c) PORT SUDAN AREA.								
1 Boys Secondary	..	..	26	—	—	—	—	—
3 Boys Intermediate	..	..	166	11	2	1	—	—
6 Boys Elementary	..	..	830	193	2	10	—	—
1 Girls Elementary	..	..	20	2	—	4	—	—
1 Sub-Grade	..	..	46	11	—	—	—	—
<b>Khartoum.</b>								
Boys Higher	..	..	168	3	—	—	—	—
Boys Secondary	..	..	818	49	—	3	—	—
Girls Secondary	..	..	190	39	—	2	—	—
Boys Intermediate	..	..	2,483	254	—	15	—	—
Girls Intermediate	..	..	1,036	72	—	2	—	—
Boys Elementary	..	..	5,878	1,109	—	149	—	—
Girls Elementary	..	..	1,098	205	—	—	—	—
Boys Technical	..	..	196	17	—	1	—	—
Khalwas	..	..	4,921	1,387	—	84	—	—
<b>Kordofan.</b>								
CENTRAL DISTRICT.								
3 Boys Intermediate	..	..	114	19	12	23	—	—
1 Girls Intermediate	..	..	82	36	—	—	—	—
Boys Elementary	..	..	431	129	7	161	—	—
Sub-Grade	..	..	60	17	3	—	—	—
EASTERN DISTRICT.								
Boys Elementary	..	..	583	105	58	122	—	—
Girls Elementary	..	..	181	30	11	26	—	—
Sub-Grade	..	..	273	35	22	60	—	—
NORTHERN DISTRICT.								
Boys Elementary	..	..	321	32	2	27	—	—
Girls Elementary	..	..	83	9	—	15	—	—
Sub-Grades	..	..	231	64	1	26	—	—
<b>Nuba Area.</b>								
TEGALI DISTRICT.								
Boys Elementary	..	..	320	45	99	122	—	—
Girls Elementary	..	..	57	13	10	11	—	—
JEBELS DISTRICT.								
Boys R. Intermediate and Teachers Training School	..	..	153	2	8	6	—	—
Boys Elementary	..	..	1,151	31	443	483	—	3
Girls Elementary	..	..	122	7	26	36	—	—
Sub-Grades	..	..	880	53	279	438	—	—

PROVINCE AND DISTRICT.	No. Exam- ined %	Trach- oma %	Bilhar- zia %	Spleen %	Pul. T.B. %	Ankylos- tomiasis %
<b>Kordofan Contd.</b>						
<b>WESTERN DISTRICT.</b>						
Boys Intermediate .. ..	41	5	2	10	—	—
Boys Elementary .. ..	1,236	151	237	489	—	2
Girls Elementary .. ..	222	8	17	57	—	—
Sub-Grades .. ..	1,358	166	177	425	—	—
<b>Northern.</b>						
<b>ATBARA DISTRICT.</b>						
2 Boys Intermediate .. ..	184	37	11	13	—	—
14 Boys Elementary .. ..	1,945	356	68	146	—	—
2 Girls Elementary .. ..	203	36	—	—	—	—
3 Sub-Grade .. ..	140	66	3	44	—	—
12 Khalwas .. ..	807	206	38	48	—	—
<b>WADI HALFA.</b>						
2 Boys Intermediate .. ..	235	112	64	8	—	—
6 Boys Elementary .. ..	1,148	591	190	42	—	—
4 Girls Elementary .. ..	366	202	23	7	—	—
11 Khalwas .. ..	1,956	1,152	392	85	—	11
<b>MEROWE DISTRICT.</b>						
6 Boys Elementary .. ..	992	379	18	101	—	—
4 Girls Elementary .. ..	281	132	—	11	—	—
8 Sub-Grade and Khalwas ..	1,738	485	184	79	—	—
<b>DONGOLA DISTRICT.</b>						
1 Boys Intermediate .. ..	161	96	6	2	—	—
8 Boys Elementary .. ..	1,151	509	108	51	—	1
4 Girls Elementary .. ..	283	179	11	14	—	—
7 Sub-Grade and Khalwas ..	696	352	14	20	—	—
<b>SHENDI DISTRICT.</b>						
2 Boys Intermediate .. ..	280	38	3	2	—	—
2 Boys Elementary .. ..	401	27	1	1	—	—
1 Girls Elementary .. ..	103	22	—	1	—	—
1 Sub-Grade .. ..	82	6	—	1	—	—
<b>BERBER DISTRICT.</b>						
2 Boys Intermediate .. ..	331	77	20	2	—	—
3 Boys Elementary .. ..	580	376	—	1	—	—
1 Girls Elementary .. ..	90	48	—	—	—	—
1 Sub-Grade .. ..	131	52	—	1	—	—
4 Khalwas .. ..	357	236	—	3	—	—
<b>Upper Nile.</b>						
1 Boys Secondary .. ..	26	1	2	4	—	2
2 Boys Intermediate .. ..	236	17	—	41	—	1
2 Boys Elementary .. ..	374	81	2	114	—	1
1 Girls Elementary .. ..	91	27	—	17	—	—



## 5. RURAL HEALTH.

Seven new village dispensaries were opened during the year and at the 354 dispensaries scattered throughout the Sudan, there were 5,887,474 out-patients attendances, together with 382,679 at the dressing stations.

## 6. NUTRITION.

The dietetic survey started in 1947 in the Zande country was completed during this year.

## 7. LEGISLATION.

Below is a resume of the Legislation enacted during the year affecting Public Health.

1. Quarantine (Cholera) Regulations 1948 gave powers to Medical Officers of Health to take measures to prevent the introduction of Cholera by persons arriving from Syria.

2. Poisons Amendment Regulations 1948 required that Barbituric acid, its salts and derivatives, medical Sulphonamides and Sulphones, Penicillin and preparations containing it, should be sold only on prescription.

Penthidine was added to Part I of the Poisons list.

3. Quarantine (Amendment) Ordinance 1948 extended from one month to two months the validity of regulations made by the Central Board of Public Health in cases of urgency before approval by the Governor General.

4. The Rabies Ordinance 1948 brought up to date legislation regarding this disease and removed some anomalies.

The Rabies Regulations 1948 allowed for the transit of dogs through the Sudan in certain circumstances and under certain conditions.

5. Employers and Employed Persons Ordinance 1948 made provisions for payment of wages to employed persons during absence on account of certified illness.

6. Workmen's Compensation Ordinance 1948 provided for compensation for death, or disability resulting from accidents.

## 8. HEALTH OF PROVINCES.

### (a) BLUE NILE PROVINCE.

Area	.. ..	54,775 sq.m	Population	.. ..	1,721,190
Beds	.. ..	1,173	Per 10,000 population	.. ..	6
Inpatient Admissions	.. ..	18,081	" "	.. ..	105
Outpatient Attendances	.. ..	2,020,823	" "	.. ..	11,740
Vaccinations	.. ..	76,083	" "	.. ..	442



TABLE 30.

*Medical and Health Staff.*

CATEGORY								British	Sudanese	Total
Doctor	..	..	..	..	..	..	..	5	14	19
Nursing Sister	..	..	..	..	..	..	..	2	—	2
Medical Assistant	..	..	..	..	..	..	..	—	105	105
Hospital Attendant	..	..	..	..	..	..	..	—	590	590
Public Health Inspector	..	..	..	..	..	..	..	2	—	2
Public Health Officer	..	..	..	..	..	..	..	—	7	7
Sanitary Overseer	..	..	..	..	..	..	..	—	21	21
Mosquitomen	..	..	..	..	..	..	..	—	255	255

TABLE 31.

*Work in Hospitals and Dispensaries.*

UNIT.						Beds	Inpatient Admissions as Patients	Operations	Total Outpatients Attendances
Wad Medani Hospital	..	..	..	..	..	350	5,381	1,363	183,864
Dispensaries	..	..	..	..	..	—	—	—	299,875
Abu Usher Hospital	..	..	..	..	..	178	3,096	704	26,274
Dispensaries	..	..	..	..	..	—	13	—	533,223
Sennar Hospital	..	..	..	..	..	164	2,077	256	51,112
Dispensaries	..	..	..	..	..	—	56	—	143,460
Singa Hospital	..	..	..	..	..	110	1,427	355	39,523
Dispensaries	..	..	..	..	..	—	—	—	101,603
Rozaires Hospital	..	..	..	..	..	102	1,218	278	32,508
Dispensaries	..	..	..	..	..	61	682	74	88,936
Kosti Hospital	..	..	..	..	..	138	2,605	292	93,448
Dispensaries	..	..	..	..	..	4	46	—	240,952
Dabim Hospital	..	..	..	..	..	66	1,480	364	35,748
Dispensaries	..	..	..	..	..	—	—	—	150,297
TOTAL						1,173	18,081	3,686	2,020,823

Infectious diseases were only sporadic and such outbreaks as there were, were quickly confined. Smallpox among the Fellata people remains a problem which is largely educational. They do not understand vaccination and still think they are being inoculated with smallpox which they understand well enough.

Malaria is still the biggest public health problem. It appears that the incidence of malaria in the Gezira Irrigated area is closely connected with the climate and the peak periods of malaria are almost identical with those in other parts of the country when irrigation does not exist. Not only the amount of rain which falls but the spacing of the falls is of importance.

Another problem is that of Bilharzia. Surveys done during the year and in 1946 and 1947 showed that only 5 per cent of the villages surveyed were free from infection and only 10 per cent had an incidence of less than 5 per cent of the population. Most of these villages were eigher on the edge of the Irrigated Area or outside it. More than half the villages surveyed inside the Irrigated Area had an incidence of 20 per cent or more. The incidence among children is about twice that of adults and the incidence among immigrants is about double that of the local population although the majority of the immigrants have spent more than 5 years in the province and have had time to contract the disease there.

In 1948, 23,993 people were examined and among these 2,154 were found infected with *S. Mansoni* and 2,881 with *S. haematobium*. There is no doubt that the ncidence of *S. Mansoni* has increased.

Deficiency diseases are definitely less in evidence than they were in the past.

Ante-natal clinics are proving popular and there is a large demand for the services of trained midwives of which the supply is at present inadequate.

(b) DARFUR PROVINCE.

Area .. .. .	133,150 sq.m.	Population .. ..	910,585
Beds .. .. .	321	Per 10,000 population ..	4
Inpatient Admissions .. ..	15,023	„ „ „ ..	165
Outpatient Attendances .. ..	496,718	„ „ „ ..	5,455
Vaccinations .. .. .	26,219	„ „ „ ..	288

TABLE 32.  
*Medical and Health Staff.*

CATEGORY	British	Sudanese	TOTAL
Doctor .. .. .	—	4	4
Nursing Sister .. .. .	2	—	2
Medical Assistant .. .. .	—	25	25
Hospital Attendant .. .. .	—	135	135
Public Health Inspector .. .. .	—	—	—
Public Health Officer .. .. .	—	1	1
Sanitary Overseer .. .. .	—	2	2
Mosquitoman .. .. .	—	71	71



TABLE 33.

Work in Hospitals and Dispensaries.

UNIT.	Beds	Inpatient Admissions as Patients	Operations	Total Outpatient Attendances
El Fasher Hospital .. .. .	159	2,700	479	134,915
Dispensaries .. .. .	44	6,504	—	198,834
Geneina Hospital .. .. .	64	2,887	188	29,367
Dispensaries .. .. .	—	589	—	37,639
Nyala Hospital .. .. .	54	1,034	290	39,867
Dispensaries .. .. .	—	1,309	—	56,096
TOTAL .. .. .	321	15,023	957	496,718

Rains were good and well spaced and crops reasonable except in Northern Darfur, and the general health remained fairly satisfactory. No major epidemics occurred.

New bores for water supply were dug in various parts and the Wadi Golo scheme started for El Fasher. But water supplies still remain a serious problem.

Two British Nursing Sisters were appointed to the Province and ante-natal clinic started in El Fasher which proved very popular.

3 dispensaries were rebuilt and new dispensary built at Kereinik. Both in-patient and outpatient figures increased, the major increases being in dispensaries.

The heavier rainfall produced an increase in mosquito infections and in malaria but the number of Aedes infections was reduced.

There were a few sporadic cases of smallpox most of them imported.

50 cases of relapsing fever occurred but the widespread use of insecticidal dusting stopped any spread.

Venereal disease accounted for over 30 per cent. of admission to hospital and syphilis for 38 per cent of all admissions to hospitals and dispensaries.

(c) EQUATORIA PROVINCE.

Area .. .. .	76,495 sq.m.	Population .. .. .	620,344
Beds .. .. .	1,491	Per 10,000 population .. .. .	24
Inpatient Admissions .. .. .	28,622	" " " .. .. .	461
Outpatient Attendances .. .. .	897,151	" " " .. .. .	14,462
Vaccinations .. .. .	1,655	" " " .. .. .	27



TABLE 34.

*Medical and Health Staff.*

CATEGORY	British	Sudanese	TOTAL
Doctor .. .. .	5	8	13
Nursing Sister .. .. .	4	—	4
Medical Assistant .. .. .	—	30	30
Hospital Attendant .. .. .	—	321	321
Public Health Inspector .. .. .	1	—	1
Public Health Officer .. .. .	—	1	1
Sanitary Overseer .. .. .	—	12	12
Mosquitoman .. .. .	—	64	64

TABLE 35.

*Work in Hospitals and Dispensaries.*

UNIT	Beds	Inpatient Admission as Patients	Operations	Total Outpatients Attendances
Juba Hospital .. .. .	293	5,900	839	61,791
Dispensaries .. .. .	32	1,084	—	60,675
Torit Hospital .. .. .	100	2,751	180	50,166
Dispensaries .. .. .	53	2,170	—	127,996
Meridi Hospital .. .. .	100	884	143	19,006
Dispensaries .. .. .	90	1,163	—	20,374
Yei Hospital .. .. .	102	1,419	112	105,944
Dispensaries .. .. .	64	2,255	—	142,526
S. Yubu Hospital .. .. .	120	1,585	176	21,201
Dispensaries .. .. .	216	2,679	—	27,703
Kapoeta Hospital .. .. .	45	1,016	194	16,614
Dispensaries .. .. .	36	1,005	—	44,471
Li Rangu Hospital .. .. .	115	1,839	357	28,907
Dispensaries .. .. .	85	2,542	—	66,276
Lui Hospital C.M.S. .. .. .	40	330	168	103,501
TOTALS .. .. .	1,491	28,622	2,169	897,151

Grain and crop shortage generally was a major problem in nearly all districts of the province and the provision of rations for hospitals in all except the Zande district was difficult and expensive.

At the beginning of May 1948 the old Equatoria province was divided into two separate provinces and the medical districts of Wau and Rumbek went to the Bahr el Ghazal province with H.Q. at Wau.

During May and June a party of American Scientists under the auspices of the U.S. Navy and the University of California worked in Torit area investigating problems in malaria and other conditions.

Investigations into Onchocerciasis and *Simulium damnosum* were carried out at Mvolo and round Wau. The problem of *S. damnosum* in that area appears to be very difficult to solve.

An investigation was made by Mrs. Culwick into the diet of the Zande people and attention paid to signs of malnutrition in the same area.

Village latrine campaigns have been extended and are proving successful both from the point of view of ancylostomiasis and general hygiene.

Training of southern staff has continued successfully and the standard generally is higher.

Welfare centres were opened at Yei and Juba.

The total known cases of leprosy at the end of the year was 8,595. The leprosy survey is being extended to the Moru and then to the Bari.

Malaria was more prevalent than usual. Results of proguanil prophylaxis were conflicting with some successes and other failures in spite of what is considered to be adequate dosage regularly taken.

There were 75 cases of Sleeping Sickness during the year but the disease is in no way out of control.

#### (d) KASSALA PROVINCE.

Area .. .. .	116,000 sq.m.	Population .. ..	716,104
Beds .. .. .	871	Per 10,000 population ..	12
Inpatient Admissions ..	11,498	" " " ..	160
Outpatient Attendances ..	1,060,417	" " " ..	14,808
Vaccinations .. ..	110,690	" " " ..	1,545

TABLE 36.

#### *Medical and Health Staff.*

CATEGORY	British	Sudanese	Total
Doctor .. .. .	3	8	11
Nursing Sister .. .. .	2	—	2
Medical Assistant .. .. .	—	31	31
Hospital Attendant .. .. .	—	224	224
Public Health Inspector .. .. .	1	1	2
Public Health Officer .. .. .	—	1	1
Sanitary Overseer .. .. .	—	10	10
Mosquitoman .. .. .	—	115	115



TABLE 37.

*Work in Hospitals and Dispensaries.*

UNIT					Beds	Inpatient Admissions as Patients	Operations	Total Outpatient Attendances
Kassala Hospital	..	..	..	..	212	3,057	489	122,739
Dispensaries	..	..	..	..	30	345	—	144,294
Dressing Stations	..	..	..	..	2	—	—	59,143
Gedaref Hospitals	..	..	..	..	234	2,968	409	187,596
Dispensaries	..	..	..	..	47	441	—	161,897
Dressing Stations	..	..	..	..	—	—	—	27,317
Port Sudan Hospital	..	..	..	..	246	3,776	471	100,624
P.S. East Side Hospital	..	..	..	..	—	—	—	29,134
P.S. Central Prison	..	..	..	..	31	284	—	22,232
Dispensaries	..	..	..	..	35	528	—	181,608
Suakin Quarantine	..	..	..	..	34	99	—	23,833
TOTAL					871	11,498	1,369	1,060,417

*Northern Area.*

In general the health was satisfactory except for Tokar area where 363 cases of pneumonia occurred mainly secondary to measles and Influenza—Mortality rate was low.

In this area too the rise in the number of Tuberculosis cases gave rise to concern.

Admissions to hospital increased slightly and outpatient attendances also went up.

The pilgrimage was rather smaller than had been expected 10,890 and was smaller than in 1947. It was declared clean and period of detention for returning pilgrims at Suakin was fixed at 24 hours.

A child welfare clinic was opened in Port Sudan in April and a second one at the end of the year.

Up to the end of the year 265 new cases attended.

Trained midwives delivered a total of 540 cases in Port Sudan and 219 elsewhere in the area.

*Southern Area*

Rains were moderate and crops average.

An epidemic of smallpox which started in 1947 continued into this year and some fresh infections arrived from across the Eritrean and Ethiopian frontiers. 152 cases occurred with 20 deaths. Most of these occurred in the Gedaref area.

More cases of Leishmaniasis were reported at Gedaref 295 cases as compared with 199 in 1947. 42 cases were fatal.



In general admissions and outpatient attendances were slightly lower than for 1947. There was an increase in Malaria in Gedaref area where the rainfall was heavier than usual. The opposite applied to Kassala area.

There was a drop in the number of pulmonary tuberculosis cases only 75 being discovered as against 210 in 1947. There was a similar reduction in non-pulmonary cases.

(e) KHARTOUM PROVINCE.

Area .. ..	5,700 sq.m.	Population .. ..	379,698
Beds .. ..	1,070	Per 10,000 population ..	25
Inpatient Admission ..	14,817	" " "	390
Outpatient Attendances	1,415,578	" " "	37,282
Vaccinations .. ..	34,917	" " "	919

TABLE 38.

*Medical and Health Staff.*

CATEGORY	British	Sudanese	Total
Doctor .. ..	11	19	30
Nursing Sister .. ..	13	5	18
Medical Assistant .. ..	—	26	26
Hospital Attendant .. ..	—	407	407
Public Health Inspector .. ..	1	3	4
Public Health Officer .. ..	—	3	3
Sanitary Overseer .. ..	—	14	14
Mosquitoman .. ..	—	101	101

TABLE 39.

*Work in Hospitals and Dispensaries.*

UNIT	Beds	Inpatient Admissions as Patients	Operations	Total Outpatient Attendances
Khartoum C.H. .. ..	306	4,893	828	152,596
Omdurman C.H. .. ..	240	4,160	1,286	222,934
Khartoum North C.H. .. ..	50	887	34	35,604
River Hospital .. ..	204	1,333	67	35,091
Khartoum Eye Hospital .. ..	110	1,081	2,048	90,659
Isolation Hospital .. ..	66	283	—	—
Dispensaries .. ..	22	302	—	832,141
MISSIONS :				
C.M.S. Hospital Omdurman .. ..	72	1,878	110	46,553
TOTAL .. ..	1,070	14,817	4,373	1,415,578

*Khartoum.*

Rainfall was well below average and grazing and crops were poor.

A new Health Centre in Khartoum was built by the Municipality and opened in July. It comprises a dispensary for women and children, outpatients, a maternity and child welfare section and registration office for births and deaths.

Attendances at ante-natal clinics in the province increased from 16,870 to 17,859 while child welfare attendances increased by 33 per cent. 7,652 home visits were made by the Health Visitor Service.

Tuberculosis dispensaries were opened in Khartoum, Khartoum North, Omdurman in September for the supervision of those under domiciliary treatment and of contacts.

A survey of population density was undertaken and showed gross overcrowding in certain areas. Extensive building however is under way.

The number of cases notified of Pulmonary Tuberculosis was 115, rather more than in 1947 but not much above the average.

**(f) KORDOFAN PROVINCE.**

Area .. .. .	146,930 sq.m.	Population ..	1,568,606
Beds .. .. .	1,093	Per 10,000 Population ..	7
Inpatient Admissions ..	21,873	.. .. .	131
Outpatient Attendances ..	1,780,653	.. .. .	11,351
Vaccinations .. .. .	231,236	.. .. .	1,474

TABLE 40.

*Medical and Health Staff.*

CATEGORY	British	Sudanese	Total
Doctor .. .. .	2	8	10
Nursing Sister .. .. .	2	—	2
Medical Assistant .. .. .	—	45	45
Hospital Attendant .. .. .	—	256	256
Public Health Inspector .. .. .	—	—	—
Public Health Officer .. .. .	—	2	2
Sanitary Overseer .. .. .	—	10	10
Mosquitoman .. .. .	—	69	69



TABLE 41.

*Work in Hospitals and Dispensaries.*

UNIT	Beds	Inpatient Admissions as Patients	Operations	Total Outpatient Attendances
El Obeid Hospital .. .. .	293	5,259	937	388,235
El Obeid Dispensaries .. .. .	146	2,693	—	376,624
Dressing Stations .. .. .	—	—	—	30,923
Kadugli Hospital .. .. .	100	2,443	319	95,435
„ Dispensary .. .. .	176	3,243	—	298,305
Dilling Hospital .. .. .	86	2,280	246	63,778
Talodi Hospital .. .. .	60	977	68	31,341
Nahud Hospital .. .. .	124	1,707	137	176,677
Dispensaries .. .. .	108	989	—	243,909
MISSIONS :				
S.U.M. Dispensaries .. .. .	—	468	—	33,904
C.M.S. „ .. .. .	—	1,814	—	41,522
TOTAL .. .. .	1,093	21,873	1,707	1,780,653

*Kordofan Province.*

The rains were variable, overall the grain crop was less good than in the previous year.

There was a general increase in the medical work as evidenced by the inpatient and outpatient figures, the increase was especially noticeable on the surgical work carried out in El Obeid Hospital where 937 operations were performed as compared with 552 in 1947.

The danger of uncontrolled West African immigration was seen when in April an outbreak of smallpox occurred in the Fallata quarter of El Obeid, the disease spread rapidly through the town and the other areas in the province.

The distribution of cases was as follows : —

El Obeid Town .. .. .	286
El Obeid District .. .. .	405
Nahud District .. .. .	66
Nuba Mountains Area .. .. .	295

there were 201 deaths. Stringent measures were taken to control the disease, and 231,236 vaccinations were carried out.

Four cases of Cerebrospinal Meningitis occurred and 31 cases of Relapsing Fever, the latter all were reported from the Tegali Area of the Nuba Mountains.

There were no other major outbreaks of epidemic disease.

As regards endemic disease there is little general change to report.



17 cases of so-called Tropical Ulcer were found to contain Leishman Donovan bodies, 2 cases of Kala Azar, one imported from Darfur Province and one from the Southern end of Kassala Province were diagnosed.

The leprosy survey which was begun in 1947 was continued into 1948, and a total of 1,651 cases has now been found.

Tuberculosis in both its pulmonary and non-pulmonary forms shows a slightly increased incidence.

The Child Welfare Centre in El Obeid shows every sign of being appreciated by the local population, the Sudanese Health Visitor has done very good work both in the centre and in home visiting.

Four pupil midwives have been earmarked for the new school which will be opened next year.

(g) NORTHERN PROVINCE.

Area .. .. .	236,200 sq.m.	Population ..	666,413
Beds .. .. .	652	per 10,000 population ..	9
Inpatient Admissions .. ..	9,635	" " " ..	143
Outpatient Attendances ..	1,399,834	" " " ..	21,006
Vaccinations .. .. .	23,000	" " " ..	345

TABLE 42.

Medical and Health Staff.

CATEGORY	British	Sudanese	Total
Doctor .. .. .	2	8	10
Nursing Sister .. .. .	2	—	2
Medical Assistant .. .. .	—	48	48
Hospital Attendant .. .. .	—	146	146
Public Health Inspector .. ..	1	—	1
Public Health Officer .. .. .	—	3	3
Sanitary Overseer .. .. .	—	16	16
Mosquitoman .. .. .	—	166	166

TABLE 43.

*Work in Hospital and Dispensaries.*

UNIT.	Beds	Inpatient Admissions as Patients	Operations	Total Outpatient Attendances
Atbara Hospital .. .. .	232	3,481	722	132,254
Dispensaries .. .. .	—	—	—	356,690
Berber .. .. .	20	342	64	102,995
Merowe Hospital .. .. .	72	1,487	185	19,523
Dispensaries .. .. .	—	—	—	130,040
Dressing Stations .. .. .	—	—	—	59,388
Wadi Halfa Hospital .. .. .	194	2,409	355	108,054
Dispensaries .. .. .	—	—	—	153,463
Dressing Stations .. .. .	—	—	—	58,577
Dongola Hospital .. .. .	64	1,020	185	54,443
Dispensaries .. .. .	—	—	—	97,416
Dressing Stations .. .. .	—	—	—	58,293
Shendi Hospital .. .. .	70	896	174	68,748
<b>TOTAL .. .. .</b>	<b>652</b>	<b>9,635</b>	<b>1,685</b>	<b>1,399,884</b>

*Northern Province.*

The health of this province was satisfactory.

As regards epidemic disease 3 cases of smallpox occurred in Atbara Hospital.

Wadi Halfa Quarantine dealt with 20,714 persons entering the Sudan, 8 cases of Relapsing Fever, 288 cases of Schistosomiasis, 3 cases of Tuberculosis were discovered amongst these people as well as other diseases.

Of the endemic diseases the figures for Bilharzia show no significant change, but the increasing number of pump schemes will no doubt bring in its train an increase in the incidence of this disease.

A heavily infected focus of Ankylostomiasis was discovered in Dongola area. Mass treatment, and the digging of trench latrines as a preventive measure, were carried out and it is hoped that the survey to be carried out in 1949 will show a drop in the 50 per cent. infection rate found this year.

There was an outbreak of Enteric Fever in Merowe District, 30 cases occurring out of a total of 64 cases diagnosed in the whole province.

Fewer cases of malaria were seen, *Anopheles gambiae* control continues to be completely effective in Wadi Halfa area.

**(h) UPPER NILE PROVINCE.**

Area .. .. .	92,270 sq.m.	Population ..	742,933
Beds .. .. .	417	per 10,000 population ..	6
Inpatient Admissions .. .. .	8,471	" " "	114
Outpatient Attendances .. .. .	455,951	" " "	6,137
Vaccinations .. .. .	9,598	" " "	129



TABLE 44.

*Medical and Health Staff.*

CATEGORY	British	Sudanese	Total
Doctor .. .. .	2	2	4
Nursing Sister .. .. .	2	—	2
Medical Assistant .. .. .	—	21	21
Hospital Attendant .. .. .	—	76	76
Public Health Inspector .. .. .	—	—	—
Public Health Officer .. .. .	—	1	1
Sanitary Overseer .. .. .	—	3	3
Mosquitoman .. .. .	—	33	33

TABLE 45.

*Work in Hospitals and Dispensaries.*

UNIT.	Beds	Inpatient Admissions as Patients	Operations	Total Outpatients Attendances
Malakal Hospital .. .. .	254	3,717	1,226	83,508
Dispensaries .. .. .	139	4,548	—	287,581
MISSIONS :—				
American Mission .. .. .	24	206	—	76,021
Sudan Interior Mission .. .. .	—	—	—	8,841
TOTAL .. .. .	417	8,471	1,216	455,951

Rains in this province were good and crops reasonable. The general economic situation of the people has been improved by widespread prophylactic treatment of the province cattle against trypanosomiasis and a series of Hafirs have been dug in the Renk district.

One new dispensary was opened at Wath Keic on the main Nile. The Fashoda dispensary has been taken over and staffed by the Shilluk Local Administration.

Various building improvements were carried out including a new outpatient department and a new administration block. There has been considerable progress in ante-natal and midwifery work.

General medical work increased considerably and 1,226 operations were done as compared with 700 in 1947.



Considerable success is reported in the use of paludrine as a prophylactic against malaria.

Two cases of Onchocerciasis were found at Pochola on the Ethiopian border east of Pibor. *Simulium damnosum* was found there and also at Yabus Bridge for the first time.

(i) BAHR-EL-GHAZAL PROVINCE.

Area .. .. .	77,000 sq.m.	Population ..	723,728
Beds .. .. .	497	per 10,000 population ..	7
Inpatient Admissions ..	12,491	" " "	171
Outpatient Attendances ..	293,129	" " "	4,017
Vaccinations .. ..	83,049	" " "	1,138

TABLE 46.

Medical and Health Staff.

CATEGORY	British	Sudanese	Total
Doctor .. .. .	1	3	4
Nursing Sister .. .. .	—	—	—
Medical Assistant .. .. .	—	18	18
Hospital Attendant .. .. .	—	137	137
Public Health Inspector .. .. .	—	—	—
Public Health Officer .. .. .	—	—	—
Sanitary Overseer .. .. .	—	5	5
Mosquitoman .. .. .	—	32	32

TABLE 47.

Work in Hospitals and Dispensaries

UNIT.	Beds	Inpatient Admissions as Patients	Operations	Total Outpatient Attendances
Wau Hospital .. .. .	235	3,504	327	32,312
Dispensaries .. .. .	47	4,230	—	85,078
Dressing Stations .. .. .	—	908	—	64,676
Rumbek Hospital .. .. .	129	1,858	148	38,269
Dispensaries .. .. .	68	1,991	—	48,432
Dressing Stations .. .. .	18	—	—	24,362
TOTAL .. .. .	497	12,491	475	293,129

In the middle of the year Equatoria Province was divided into two: Wau Area and the Lakes district becoming Bahr el Ghazal province.

There is little to report in the Wau Area except that the Wau leper colony was moved to a new site at Ajek six miles south of Wau.

In the Lakes district there was a shortage of grain following the drought of 1947, this shortage was met by importing grain, nevertheless, there were signs of under-nourishment amongst the Dinka.

The Smallpox epidemic of the previous year declined and faded away, 27 cases were seen all in the first half of the year. No other epidemic diseases of importance occurred.

Some investigations were carried out by the Ophthalmic Surgeon in the ocular manifestations of onchocerciasis. He reported that areas where this disease is endemic are widely scattered and the inhabitants comparatively few in number, staffing difficulties prevent the effective covering of these areas, as a result when patients with ocular manifestations are seen not much relief can be given.

Prophylaxis in the form of eradication of the vector—*Simulium damnosum* seems to be impracticable at present.

114 cases of Dracontiasis were recorded, the construction of anti-guinea-worm wall tops makes slow progress.

The distribution of field microscopes to dispensaries in the Wau area will it is hoped provide information during the next few years which will give us a clearer picture of the incidence of diseases such as Ankylostomiasis and Schistosomiasis.

In general the incidence of the various endemic diseases shows no significant change.



## CHAPTER VI.

### THE PILGRIMAGE FROM THE SUDAN.

The number of pilgrims leaving from Suakin during the last ten years has been :

1939/40	3,204	1944/45	6,999
1940/41	2,085	1945/46	6,214
1941/42	8,467	1946/47	8,404
1942/43	7,670	1947/48	12,020
1943/44	17,818	1948/49	11,105

TABLE 48.

*Out-Going Pilgrimage from the Sudan : 1948/49.*

NATIONALITY	1944/45	1945/46	1946/47	1947/48	1948/49
Sudanese .. .. .	1,434	610	1,409	2,210	2,011
West Africans and Others .. .. .	5,565	5,604	6,995	9,810	9,094
TOTALS .. .. .	6,999	6,214	8,404	12,020	11,105

TABLE 49.

*Returning Pilgrimage to the Sudan 1948/49.*

NATIONALITY	1944/45	1945/46	1946/47	1947/48	1948/49
Sudanese .. .. .	1,441	624	1,409	2,555	2,086
West Africans and Others .. .. .	5,295	5,730	6,662	8,185	7,923
TOTALS .. .. .	6,736	6,354	8,071	10,740	10,009

The first of sixteen outward sailings was on 8.9.1948 and that last on 8.10.48 and the first of the fourteen return sailings was on 22.10.1948 and the last being on 22.12.1948.

The number of pilgrims leaving Suakin was only slightly smaller than that of last year. All pilgrims were vaccinated against smallpox and inoculated against cholera, with calf lymph and vaccine made in the Stack Medical Research Laboratories. Every pilgrim, without a valid yellow fever inoculation certificate, was detained at Suakin until he had spent six clear days since leaving the yellow fever endemic area. The health of the pilgrims during the pilgrimage and on their return was satisfactory. A medical mission consisting of two doctors, a medical assistant, a sanitary overseer and subordinate hospital staff was sent to Saudi Arabia. The mission set up its tented hospital just outside Jedda and also treatment centres at Medina and Mecca. The facilities provided were much appreciated by the Sudan pilgrims, also by the local natives, and were an important factor in maintaining the health of the pilgrims. On their return journey the pilgrimage having been declared clean, the period of detention at Suakin quarantine was for 24 hours only. This period began after all medical formalities had been completed.

TABLE 50.  
*Admissions and Deaths in Suakin Quarantine 1948 '49 Pilgrimage*

DISEASES						ADMISSIONS			Total	Deaths
						Men	Women	Children		
Chicken Pox	..	..	..	..	..	2	—	—	2	—
A. Dysentery	..	..	..	..	..	1	—	—	1	1
B. Dysentery	..	..	..	..	..	1	—	—	1	1
Pneumonia	..	..	..	..	..	3	—	—	3	1
Pleurodinia	..	..	..	..	..	1	—	—	1	—
TOTALS .. ..						8	—	—	8	3

TABLE 51.  
*Medical Mission—Total Number of Attendances, Admissions and Deaths.*

PLACE	TOTAL ATTENDANCES				ADMISSIONS			DEATHS		Total
	Sudanese	West Afr.	Others	Total	Sudanese	West Afr.	Total	Sudanese	West Afr.	
Jedda ..	775	573	4,511	5,859	20	—	20	1	1	2
Mecca ..	1,079	205	937	2,221	8	4	12	2	5	7
Muna ..	—	—	—	405	8	—	8	—	—	—
Arafat ..	—	—	—	298	—	—	—	—	1	1
Medina ..	1,520	247	2,516	3,580	8	—	8	2	1	3
TOTALS ..	3,374	1,025	7,964	12,363	44	4	48	5	8	13



## CHAPTER VII.

### THE MEDICAL WORK OF MISSIONS.

Four missions carry out medical work. The Church Missionary Society ; the Sudan United Mission ; the Sudan Interior Mission and the American Mission.

TABLE 52.

*Church Missionary Society : Medical Work : 1948.*

PLACE	UNIT	Outpat. Attends	Inpat. Adms.	Major Oper.	REMARKS
Omdurman ..	Hospital and Infant welfare centre ..	46,553	1,878	110	Infant welfare consultations 2,490.
Abu Rof ..	Dispensary and Infant welfare centre	15,590	—	—	Infant welfare consultations 1,432.
Abu Kadog ..	Dispensary and Infant welfare centre	4,968	—	—	Infant welfare consultations 6,784.
Wad Nubawi	Infant welfare centre	—	—	—	Infant welfare consultations 1,148.
Bet el Mal ..	Infant welfare centre .. ..	—	—	—	Infant welfare consultations 1,133.
Sallara ..	Dispensary ..	26,817	264	—	
Katcha ..	Dispensary ..	14,705	1,551	—	
Kauda ..	Dispensary ..	—	—	—	
Lui .. ..	Hospital .. ..	2,337	330	168	} C.M.S. Gordon Memorial Mission.
Zeraf ..	Hospital .. ..	10,062	—	—	
Malek ..	Dispensary ..	—	—	—	
Ler .. ..	Dispensary ..	—	—	—	

TABLE 53.

*Sudan United Mission : Medical Work 1948.*

PLACE	UNIT.	Outpat. Attends	Inpat. Adms.	Major Oper.	REMARKS
Heiban ..	Dispensary ..	11,801	166	—	
Abri .. ..	Dispensary ..	22,103	302	—	
	TOTALS .. ..	33,904	468	—	

TABLE 54.

*Sudan Interior Mission.*

PLACE	UNIT	Output. Attends	Inpat. Adms.	Major Ops.	REMARKS
Abayat ..	Dispensary ..	3,180	—	—	
Paloic ..	Dispensary ..	3,199	—	—	
Banjang ..	Dispensary ..	2,462	—	—	
TOTALS .. ..		8,841	—	—	

TABLE 55.

*American Mission.*

PLACE	UNIT	Output. Attends	Inpat. Adms.	Major Ops.	REMARKS
Doleib Hill ..	Dispensary ..	16,348	109	—	
Nasir ..	Dispensary ..	53,014	97	—	
Wanglel ..	Dispensary ..	6,659	—	—	
TOTALS .. ..		76,021	—	—	



## CHAPTER VIII.

### THE STACK MEDICAL RESEARCH LABORATORIES.

DR. R. KIRK.

#### RESEARCH.

Summaries of the principal researches carried out during the year will be found under the appropriate headings. For various reasons, this year has been a disturbed one, but work has been continued on leishmaniasis, tuberculosis, onchocerciasis and the pox virus diseases. The most interesting feature is perhaps the resumption of studies on schistosomiasis after a period of over 10 years.

#### ROUTINE AND EDUCATIONAL ACTIVITIES.

A summary of the routine work and examinations carried out in the central laboratories during the year is appended to this report. The number of examinations was 26,695 as compared with 32,610 last year. This desirable reduction in numbers is largely due to the policy of increasing, wherever possible, the number and variety of simple routine tests carried out in the various hospital laboratories. As there has been a steady upward trend in the number of routine examinations required in all parts of the country, it is essential that this policy of decentralisation should be vigorously pursued with a view to increasing the efficiency of medical services in the provinces, and at the same time allowing the central laboratories to concentrate on the more complex examinations which are becoming increasingly necessary with advances in medical science.

It has always been the rule to exclude from this report the work done by hospital laboratories. The inclusion of this work would raise the number of routine examinations to a very formidable figure. The work of the hospital laboratories is an essential item in the efficient functioning of the Medical Service throughout the country. It is carried out by scale K and J members of the laboratory service trained in, and generally supervised from, the Stack Laboratories, to which they are periodically recalled for refresher courses. Disappointments happen occasionally, but it is my impression that Medical Inspectors and others very much appreciate the assistance given by these hospital laboratories and the importance of the work carried out in them all over the country.

Dr. Horgan went as Sudan delegate to the Fourth International Congresses on Tropical Medicine and Malaria, held in Washington in May and Mr. Lewis attended the Trypanosomiasis Conference held in Brazaville in February. As in previous years teaching duties in the Medical School have made considerable demands on the time and energy of the staff.

**Staff changes**—Dr. E. S. Horgan retired from the service of the Sudan Government at the end of this year. Two veteran members of the Sudanese staff also retired this year, after over 30 years' service, Sadig Mohd., head messenger, and Mohd. Abu Dira'a, head attendant in the animal houses.

One Sudanese laboratory assistant was trained in 1948, bringing the total to 42. The number of hospital laboratories is now 28 as compared with 26 last year.

POST-MORTEMS.

17 were carried out in Khartoum hospital, of which 7 were medico-legal.

PATHOLOGICAL SPECIMENS.

The total was 493 (excluding brains for rabies).

NEOPLASMS.

134 malignant Neoplasma were received, and the following table is a brief summary.

SITE.	Carcinoma	Sarcoma	Endothelioma	Melanoma	Mixed Tumours	TOTAL
Scalp .. ..	3	—	—	—	—	3
Face .. ..	4	—	—	—	3	7
Lip .. ..	—	—	1	—	—	1
Mouth .. ..	4	—	—	—	—	4
Ear .. ..	1	—	—	—	—	1
Maxilla .. ..	1	—	—	—	1	2
Nose .. ..	2	1	—	—	—	3
Eye .. ..	3	5	—	—	—	8
Neck .. ..	3	8	—	—	1	12
Thyroid .. ..	1	—	—	—	—	1
Parotid .. ..	1	—	—	—	2	3
Chest .. ..	—	1	—	—	—	1
Axilla .. ..	2	—	1	—	—	3
Hand .. ..	—	2	1	—	—	3
Arm .. ..	—	1	—	—	—	1
Leg .. ..	8	9	—	—	—	17
Foot .. ..	1	1	—	6	—	8
Intestine .. ..	1	—	—	—	—	1
Rectum—Anal Canal	3	—	—	—	—	3
Abdomen .. ..	4	—	—	—	—	4
Liver .. ..	2	—	—	—	—	2
Bladder .. ..	4	—	—	—	—	4
Groin .. ..	1	—	—	—	—	1
Penis .. ..	3	—	—	—	—	3
Testis .. ..	—	1	—	—	1	2
Ovary .. ..	2	—	—	—	—	2
Uterus .. ..	11	—	—	—	—	11
Vagina .. ..	1	—	—	—	—	1
Prostate .. ..	3	—	—	—	—	3
Breast .. ..	16	1	—	—	—	17
Lymphatic Glands ..	1	—	—	—	—	1
Skin (unspecified) ..	1	—	—	—	—	1
TOTAL .. ..	87	30	3	6	8	134



## BISEXUAL ISCHIOPAGUS.

A most interesting specimen was received from Dongola in the shape of a still born, approximately full-term double monster of the type known as ischiopagus, weighing 10 lbs. The peculiarly interesting feature of this monster was that one of its component individuals was male and the other was female. These monsters are extremely rare, and in all previous examples the two component individuals have always been of the same sex. The occurrence of both sexes in this monster indicates that it must have arisen from the fusion of binovular twins during development.

## RABIES.

304 brains were received, of which 19 were decomposed and useless for section. 84 were positive for Negri bodies, including 68 dogs, 7 donkeys, 1 horse, 2 cats, 2 cows, 1 sheep, 1 camel, 1 goat, and 1 human brain. Among the 201 negative brains were included 4 monkeys, 1 hyaena, 1 antelope and 1 pig.

The figures given above include in addition to specimens from the Sudan a number of dog brains received from Cyrenaica; the technique used for demonstrating Negri bodies is that of Lepine (*C.R. Soc. Biol.*, 1935, 119, 23,804) which has been found in these laboratories to give better results than any other.

A virulent strain of street virus was isolated from a dog in Khartoum, but proved much less resistant to storage in glycerine than the standard Paris fixed virus, and was ultimately lost for this reason.

**Rabies Vaccine**—87,450 c.cs. were issued, sufficient for the treatment of 1,166 cases. This figure includes a consignment of 50 bottles which was sent to Kenya in response to an urgent request.

## CHOLERA.

This year the work of the laboratories has been rather dominated by cholera. Although cholera does not exist in the Sudan, a considerable quantity of cholera vaccine is prepared and issued annually to Suakin quarantine for use in pilgrims travelling to Mecca. A serious epidemic of this disease occurred last year in Egypt and as recurrence was feared this year steps were taken to meet any possible emergency which might arise in the Sudan. Very large stocks of cholera vaccine were built up and held in reserve. In addition plans were made to ensure that all resources could be switched over to mass production of cholera vaccine at any time. Fortunately the necessity did not arise.

The cholera vaccine has been standardised at 8,000 mills per cc. It is prepared from two standard strains of the Inaba and Ogawat types respectively, supplied by Sir John Taylor from the Kassauli Institute, India. During the year subcultures of these strains have been supplied, on request, to adjacent African territories in which the production of cholera vaccine on a large scale was also envisaged as a possibility.

## POX VIRUSES.

The results of the cross-immunity tests described in the 1947 report have now been published in two papers:—



(1) Horgan, E. S. and Haseeb, M. A. (1948). The immunological relations of "Strawberry Foot-Rot" virus of sheep. *J. Comp. Path.* 58,329.

(2) Horgan, E. S. and Haseeb, M. A. and Satti, M. H. (1948). The immunological relationships of strains of alastrim, *Brit. J. exper. Path.* 29,347.

#### **Cultivation of pox viruses on the chorio allantois of chick embryos—**

Recent work by Downie, McCallum and others in England on the differential diagnosis of smallpox suggests that cultivation of the virus in the chick embryo may prove a valuable aid in doubtful cases. The disadvantages of the method are obvious, if used as a routine diagnostic procedure ; first a supply of fertile eggs of 11—13 days incubation would have to be maintained and, second, at least two days would have to elapse before a provisional diagnosis could be made. In the Sudan the delays before the specimens of pus or crusts could be received from many out-stations not on main railway or air routes would further militate against the value of the test. In spite of these snags the method might be of great value in certain cases and hence trials were made during 1948 Downie's technique (*J. Path. and Bact.* 1947—Vol. 59—189), using crusts from smallpox and alastrim cases and scrapings from vaccinefer sheep for vaccinia.

Downie's conclusions of the differential macroscopic lesions between smallpox and vaccinia were confirmed but no differences could be detected between the lesions of smallpox and alastrim. Trials with crusts and pus from experimental goat-pox (goat) were uniform failures and as far as the writer is aware this member of the animal poxes groups has not yet been cultivated in chick embryos.

**Vaccine Lymph**—84 sheep were used with a total yield of 4,284 grms. of pulp, the average being 51 grms. per sheep. These figures compare with a total of 40 sheep with an average of 48.3 grms. per animal in 1947.

**Issues**—964,280 doses were issued.

#### **TUBERCULOSIS.**

**Tuberculin Tests in Khartoum Province**—During the last three months of 1947 and the first five months of 1948, tuberculin tests were carried out by Dr. Mansour Ali Haseeb on school children in the towns of Khartoum, Omdurman, Khartoum North and the villages of Ilafoon and Kalakla. The method followed was the graded intradermal test of Mantoux as suggested by P.D.'Arcy Hart (1932). Human Old tuberculin supplied by Burroughs Wellcome and Co. was used throughout, but before use the potency of each batch of tuberculin was tested by comparing it with the standard preparation of old tuberculin kindly supplied by the National Institute for Medical Research, Hampstead, London.

A summary of the results is given here in tabular form :—



Table 1: Khartoum, Omdurman, Khartoum North. School boys.

AGE GROUP				Total	Positive	Negative	Percent Positive
5—10 years	..	..	..	429	94	335	21.9
11—15	„	..	..	775	270	505	34.8
16—20	„	..	..	472	210	162	44.4

Table 2: School girls.

AGE GROUP				Total	Positive	Negative	Percent Positive
5—10 years	..	..	..	208	55	153	26.4
11—15	„	..	..	317	108	209	34.0
16—20	„	..	..	58	21	37	36.2

Table 3. Ilafoon boys' School.

AGE GROUP				Total	Positive	Negative	Percent Positive
5—10 years	..	..	..	97	20	77	20.6
11—15	„	..	..	51	17	34	33.3

Table 4 : Ilafoon girls' School.

AGE GROUP				Total	Postitive	Negative	Percent Positive
5—10 years	..	..	..	46	9	37	19.5
11—15	„	..	..	5	0	5	—

Table 5 : Kalakla boys' School.

AGE GROUP				Total	Positive	Negative	Percent Positive
5—10 years	..	..	..	90	31	59	34.4
11—15	„	..	..	13	9	4	69.0



## LEISHMANIASIS.

**Chemotherapy**—Intensive pentostam (sodium antimony gluconate) treatment has now passed into general use and reports, on the whole, seem favourable. A case still under observation, however, appears at the time of writing to have been resistant to very large doses of this preparation.

**Interesting strain of leishmania**—An interesting strain of leishmania has been studied for the past seven years in the laboratories. When first isolated in 1941 from an apparently typical case of Sudan kala azar it behaved as one might expect in experimental animals (monkeys), reproducing kala azar.

With repeated passage in monkeys it passed through a stage in which it caused lesions similar to those of leishmaniasis americana, and finally completely lost its virulence for these animals. Passages were made directly from monkey to monkey without the intervention of cultures, or passage through an intermediate host. A full account of this strain has been published elsewhere (Kirk, *R. Trans. R. Soc. trop. Med. and Hyg.* in the press)

**Sandflies**—By courtesy of the Keeper of Entomology, Dr. Kirk and Mr. Lewis were given access while on leave to the collections housed in the British Museum and were able to carry out re-examination of the type-specimens of the late Professor R. Newstead F.R.S. It is evident from this examination that some revision of nomenclature will be required.

During the year collections for determination have been received from West Africa, Kenya and Uganda as well as from the Sudan, and include some species new to science. This year has seen also the publication of two important papers on the sandflies of the Sudan by our distinguished colleague, Dr. L. Parrot, of Institute Pasteur d'Algerie to whom, for the past 10 years, we have regularly sent all our difficult or doubtful specimens. References are given in the report of the Medical Entomologist but the writer would like to record our indebtedness to Dr. Parrot, and his personal appreciation of this pleasant scientific collaboration, extending now over so many years.

## SCHISTOSOMIASIS.

Owing to advances in medical science many of the diseases which featured prominently in past reports, such as relapsing fever, cerebro-spinal meningitis, kala-azar, yellow fever, do not now present such urgent medical problems as formerly, since the technique of dealing with them is known and its successful application is now largely a matter of administration only. This is not the case, however, with worm diseases, of which bilharzia and filariasis are most important, and a recent paper by Stephenson (1947, *Trans R. Soc. trop. Med. and Hyg.* 40,479) has emphasized the gravity of the bilharzia problem in the irrigated area of the Sudan. Studies in bilharzia were therefore initiated during the year.

A technique was evolved of breeding and keeping the intermediate mulluscan hosts in the laboratory, based largely on that used by Gordon, Davey and Peaston (1934) in West Africa. It proved very successful with *Planorbis* spp., *Bullinus truncatus* and its varieties, but not with *B. forskali*, while we have not yet been able to obtain specimens of *Physopsis* for experiment. At 28°C it was found that the snails began to shed cercariae approximately two months after miracidial



infections. Miracidia of *S. haematobium* were observed to penetrate *Bullinus* and *Planorbis* indiscriminately although the developmental cycle was not continued in *Planorbis* but only in *Bullinus*. A small quantity of cercarial antigen was prepared from the livers of infected snails by Fairley's (1917) method.

## ONCHOCERCIASIS.

The entomological work carried out in connection with this disease is described in the report of the Medical Entomologist, and interest attaches to a report from the province Medical Inspector, Upper Nile, recording the prevalence of the disease in some localities in the Eastern Sudan.

Preliminary investigations on the chemotherapy of onchocerciasis have been undertaken by Dr. Mohamed Sati, in Wau hospital. Particulars of the dosage and method of using antrypol which has been found effective in the Congo were kindly supplied for our guidance by Dr. Van Hoof, who emphasized that severe reactions, not without danger to life, might occur in the course of treatment. Dr. Sati reports that treatment with 1 gm. of antrypol on alternate days for 10 doses was not well tolerated by patients in Wau. Severe reactions were frequent, apparently of the Herxheimer type due to the liberation of toxic substances from the tissues of the worms which had been killed in the patient's body, but possibly in some cases partly also due to toxicity of the drug itself. In the first series of 20 cases there were 4 deaths and, in view of severe reactions in other patients, the scheme of treatment had to be modified. There seems little doubt that the drug is actively filaricidal, but assessment of the results of treatment in individual cases is difficult. Satisfactory criteria of cure, which can be applied to the majority of cases, as in Kala azar, have not yet been worked out in this disease.

Nor has it been possible, as was hoped, to obtain a series of selected cases in which the action of chemotherapy could be estimated by its effect on specific and important clinical manifestations which appear in only a small proportion of cases.

The other lines of chemotherapy investigated by Dr. Sati was intensive pontostam treatment which, although not associated with toxic effects, appears to have no action in onchocerciasis in the doses which have been found effective in Kala azar.

## TYPE SERIES OF OPALINIDAE.

The type series of Opalinidae which was originally deposited by Metcalf for custody in the Wellcome Tropical Research Laboratories, and has since 1927 been stored in the Stack Laboratories was this year handed over to the Department of Zoology in Gordon Memorial College. The institutions in which his specimens were deposited are listed by Metcalf (1923) in his monograph on "The Opalinid ciliate infusoria" *Smithsonian Inst. Nat. Mus. Bull.* 120.

## Summary of Routine Examinations

Khan Tests .. .. .	13,528
Widal Reactions .. .	1,235
Weil-Felix Reactions .. .. .	1
Heterophile Agglutinations (Paul-Bunnell) ..	4
Blood Cultures .. .. .	632
Blood Films .. .. .	1,865
Blood Counts (Total) .. .. .	88
Cerebrospinal Fluids .. .. .	74
Medico-Legal Tests (Blood and Seminal stains) ..	67
Bio-Chemical Tests .. .. .	324
Autogenous Vaccines .. .. .	5
Pathological Histology (including brains for rabies)	778
Faeces .. .. .	2,332
Urines .. .. .	1,637
Throat and Nasal Swabs for <i>C.diphtheriae</i> Positive	186
"          "          "          "          " Negative	3,025
Virulence Tests ( <i>C. diphtheriae</i> ) .. .. .	3
Sputa <i>Myco. Tuberculosis</i> Positive .. .. .	35
"          "          "          "          " Negative .. .. .	143
Spleen Smears (Kala azar positive) .. .. .	7
General Bacteriological Examinations .. .. .	514
Water Examinations .. .. .	150
Food Examinations .. .. .	62
Total Examinations ..	26,695

### Summary of Faeces Examinations

<i>Bact dysenteriae</i> Flexner V.Z. series	..	..	91
<i>Bact. dysenteriae</i> Sonne	..	..	2
<i>Bact. shigae</i>	..	..	29
<i>Bact. ambiguum</i> (Schmitz)	..	..	6
<i>Bact. typhosum</i>	..	..	69
<i>Bact. paratyphosum</i> A.	..	..	7
<i>Bact. paratyphosum</i> B.	..	..	1
<i>Entamoeba histolytica</i>	..	..	20
Ova present	..	..	26
Negative	..	..	2,081

## Summary of Urine Examinations

<i>Bact. typhosum</i>	..	..	..	..	..	49
<i>Bact. paratyphosum</i> A.	..	..	..	..	..	4
<i>Bact. paratyphosum</i> B.	..	..	..	..	..	1
Ova present	..	..	..	..	..	1
Negative	..	..	..	..	..	1,582



### *Summary of Blood Films*

Malaria :—

„	Benign Tertian	..	..	..	30
	Subtertia	..	..	..	369
	Double Infection (B.T.—S.T.)	..	..	..	1
	Negative	..	..	..	1,465

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### *Summary of Widal Reactions.*

<i>Bact. typhosum</i>	..	..	..	..	169
<i>Bact. paratyphosum A.</i>	..	..	..	..	3
<i>Bact. paratyphosum B.</i>	..	..	..	..	1
<i>Br. melitensis</i>	..	..	..	..	64
Negative	..	..	..	..	998

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### *Summary of Blood Cultures.*

<i>Bact. typhosum isolated</i>	..	..	..	53
<i>Bact. paratyphosum A isolated</i>	..	..	..	2
<i>Bact. paratyphosum B isolated</i>	..	..	..	3
<i>Br. melitensis isolated</i>	..	..	..	1
<i>Strep. pyogenes isolated</i>	..	..	..	7
Other organisms isolated	..	..	..	6
Negative	..	..	..	560

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### *Summary of Weil-Felix Reactions.*

Negative	..	..	..	..	..	1
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### *Summary of Heterophile Agglutination Tests.*

Negative	..	..	..	..	..	4
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### *Summary of Khan Tests*

Positive	..	..	..	..	..	3,568
Negative	..	..	..	..	..	9,960

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### *Vaccines Issued During 1948.*

T.A.B.	..	..	..	..	..	16,050 cc.
Anti-rabic	..	..	..	..	..	87,450 cc.
Cholera	..	..	..	..	..	35,100 cc.
Vaccine lymph	..	..	..	..	..	964,280 doses

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## CHAPTER IX.

### MEDICAL ENTOMOLOGY.

MR. D. J. LEWIS.

Routine work comprised tests of insecticides, liaison with the Colonial Insecticides Committee, answering enquiries, identification of insects received from many districts, instruction in mosquito and house fly control, and the preparation of monthly summaries from reports of *Aedes aegypti* control.

As in previous years the Section benefited greatly from facilities provided by the Agricultural Research Division.

"S. M. S. Repellent" (Dimethyl phthalate) proved effective in many parts of the country; now that supplies are more readily obtainable this repellent is being publicised in order to develop it as a real public health measure rather than as a luxury for a few individuals.

### MOSQUITOES.

#### The Gezira.

Recommendations were made on methods of D.D.T. residual spraying of houses to be used in the irrigation area. 50 per cent. wettable powder, applied with a 330 c.c. syringe, was found to have definite advantages over methods previously used.

#### Wadi Halfa.

Close touch was maintained with the work of *Anopheles gambiae* prevention and the area was inspected. Nearly four years have passed since this mosquito was found near Wadi Halfa, but its occurrence at Abri in 1948 demonstrates the need for constant alertness, especially since few of the local staff will have seen *A. gambiae*.

#### Jebel Aulia Reservoir.

Swamp-breeding species appear to have decreased somewhat in the Dueim area. This may be due not only to control measures but to the effect of plant succession. In recent years *saida* or sedge (*Cyperus rotundus*) has been largely replaced by *berdi* (*Vossia cuspidata*) in which mosquitoes breed sparsely. Cattle graze extensively on this grass and appear to reduce mosquito breeding still further. It remains to be seen whether the large-scale removal of *berdi* for fodder will encourage the growth of *Naias pectinatus*, a matted sub-surface plant which can shelter numerous larvae including *Anopheles rufipes*. It is hoped that the cutting of *berdi* will be practicable chiefly near the main river channel where wave action should prevent breeding in *Naias*.

#### Equatoria.

A collection made by the Medical Inspector, Yambio Area, contained several species new to the Sudan.



## SAND FLIES.

Work was continued in cooperation with Dr. R. Kirk, several species new to the Sudan being discovered. Experiments were continued on the infection of sand flies with kala-azar parasites.

## CHIRONOMIDAE.

Preliminary attempts were made to kill the larvae of Chironomidae, which breed in mud at the bottom of the Blue Nile in Khartoum and give rise to a serious outbreak of adult Chironomids each winter. An aqueous suspension of benzene hexachloride was sprayed on the surface with the object of forming a fine deposit on the bottom. Many larvae died and preparations for a large scale test were made.

A short survey of Chironomid larvae was made at Wadi Halfa where the adult insects constitute a serious pest each year in March and April.

## SIMULIIDAE

### Equatoria.

Investigations were carried out at Mvolo where nearly all the inhabitants are infected with Onchocerciasis and many are blind. *Simulium damnosum* was found to be the only local species to bite man. Captured females were fed on infected people and the subsequent development of *Onchocerca volvulus* in the flies showed that *S. damnosum* was the insect host.

Some 1600 captured flies were dissected and the maximum infection rates observed appear to be the highest in the world yet recorded for developing *Onchocerca*. On one day when 30 flies were dissected, 40 per cent were infected and 12 per cent contained infective worms in the head. Up to 11 infective worms were present in a single fly. The insects were often biting at the rate of several hundred an hour and it was evident that an unprotected person could be infected several times in a few minutes.

Although *S. neavei* has been exterminated in a part of Kenya by the use of D.D.T. as a larvicide it is unlikely that the extermination of the much further ranging *S. damnosum* will be practicable in the Sudan. The breeding places are in considerable rivers, flies can travel up to 45 miles or more in Uganda and probably in the Sudan, and observations at Mvolo suggest that they can live more than three months.

Among other observations on *S. damnosum* it was found that they often excreted large numbers of microfilariae and that several were parasitized by a Hymenopterous larva. The parasite is unlikely to effect the insect.

### Upper Nile Province.

Specimens sent by the Province Medical Inspector from Pachala proved to be *S. damnosum* and *S. adersi*. Simuliids have never before been recorded in that part of the country.

## TSETSE FLIES.

The Medical Entomologist attended the Brazzaville Trypanosomiasis Conference and afterwards visited some of the tsetse areas in Equatoria and made recommendations on control. With regard to *Glossina palpalis* it is hoped that the use of modern methods of settlement will assist in enabling advances into tsetse-infested areas to be made instead of the retreats of former times.

*Glossina tachinoides* was found for the first time in the Sudan, at Kigille by the Province Medical Inspector of the Upper Nile Province. This important West African vector of trypanosomiasis had been recorded outside West Africa only twice, in Arabia in 1906 and in the Gambeila district of Ethiopia in 1939. Fortunately it appears to be absent from our two southern provinces.

A map showing the distribution of tsetse flies in the Sudan was prepared and sent to the East African Tsetse Research Organization which is compiling a map for the whole of Africa and one for Eastern Africa.

## PUBLICATIONS.

The following papers were published.

Lewis, D. J. (1948). The mosquitoes of the Jebel Auliya Reservoir on the White Nile—Bull. Entom. Res. 39 133-157.

(1948). The Simuliidae of the Anglo-Egyptian Sudan.—Trans. Roy. Ento. Soc. Lond., 99, 475—496.

The following papers, not emanating from this section, deal wholly or partly with medical entomology in the Sudan.

Abbott, P. H. (1948). The Culicidae (Diptera) of Darfur Province, Anglo-Egyptian Sudan, with observations on the geography and zoogeographical relations of the region.—Proc. R. Ent. Soc. Lond. B, 17, 37—48.

Buxton, P. A. (1948). Trypanosomiasis in Eastern Africa.—London: H. M. Stationery Office.

Davey, T. H. (1948). Trypanosomiasis in British West Africa—London: H.M.S.O.

Parrot, L. (1948). Notes sur les phlébotomes LVIII.—Phlébotomes due Soudan Anglo-Egyptien. 1.—Arch. Inst. Pasteur Alg, 26, 121—148.



## CHAPTER X.

### THE WELLCOME CHEMICAL LABORATORIES.

DR. A. J. HENRY.

The end of the year 1948 found us unexpectedly involved in the transfer of these Laboratories from the quarters in Shambat which they have occupied since 1940 into Khartoum. From September onwards considerable time had to be spent in negotiating for suitable alternative accommodation to house the Laboratories, as it was early made clear that a new building was out of the question. Finally, adequate accommodation was offered in the first floor of the River Hospital. This was accepted with alacrity and plans for the necessary alterations were immediately drawn up. By the end of the year work on the alterations had started but had not proceeded far. When the transfer is complete we shall be far more satisfactorily accommodated than at any time since 1940, and it is expected that in consequence a significant increase in output of work will be possible. Some improvement in the staff position, which was extremely serious in 1947, has already occurred, and it is expected that the more attractive working conditions which will apply in the River Hospital will result in still further improvement.

The number of routine samples examined during the year was 679 as compared with 776 in 1947 and 867 in 1946. The decrease as compared with 1947 occurred mainly in the toxicological sub-section of the medico-legal groups, and was due to far fewer samples of household utensils being submitted for examination for lead in the surface coatings. The Medical Service again accounts, directly or indirectly, for about half of the routine work, while a substantial proportion of the work of a research or semi-research nature had also a medical bias. Leave, and negotiations regarding the transfer of the Laboratories, have, however, considerably reduced the time available for research.

The routine samples received were classified as follows, the corresponding figures for 1947 being also given :—

	1948	1947
Waters .. .. .	97	62
Foodstuffs .. .. .	184	210
Medico-legal and Miscellaneous drugs ..	133	283
Minerological .. .. .	56	55
Miscellaneous .. .. .	209	166
	<hr/> 679	<hr/> 776

During the year two original papers and the Report of the Government Analyst for 1947 were published.

## ROUTINE WORK.

### Waters.

All of the samples submitted were classified as drinking waters. About half were from the Khartoum, El Obeid and El Fasher supplies, and the remainder from widely distributed parts of the country.

### Foodstuffs.

Under this heading are included milks, examined for the Public Health authorities ; grains and flours, butter and other fats examined for suitability for consumption ; alcoholic beverages ; and a variety of miscellaneous foods.

### Medicolegal and Miscellaneous Drugs.

These are subdivided into pathological (27), toxicological (44), and miscellaneous drugs (62). Of the first groups fourteen samples, mostly post mortem specimens, were associated with twelve separate cases of suspected poisoning, the only positive finding being one case of strychnine poisoning. The remaining samples include faeces for split and unsplit fat, blood sera, urine and stone.

The toxicological samples include 21 utensils for determination of lead in surface coatings, and a wide variety of articles, mostly of plant origin submitted in connection with cases of suspected poisoning. Four samples contained stropaceous alkaloids.

The miscellaneous drugs include samples (8) of planocaine with which fatalities had occurred ; chloroform (8) for conformity with B.P. requirements; disinfectants ; samples of chemicals submitted in connection with a serious outbreak of fire at Atbara ; and a wide range of other samples.

### Mineralogical.

Included in this category are coals examined for the Railways, mineral oils and a wide range of metals and various minerals.

### Miscellaneous.

One hundred and eleven of these were oil seeds and cake examined for oil and protein content, and grains for dirt content ; thirty seven were methylated spirits examined for the Customs ; thirty seven were cases of spoilage ; the remainder include beeswax, soap, etc.

## INVESTIGATIONS.

The amount of research work which was possible during the year was not large, as there were too many interfering factors.

### *Courbonia virgata*.

Further investigation of this plant has been carried out in the hope of being able to isolate other basic constituents, in addition to tetramine and di- and trimethylamine, which it is strongly suspected are present. The work is however, rendered difficult by the low concentrations and high solubilities of the suspected minor bases. It is still hoped that it will be possible to link up *Courbonia* with the mysterious fluorescent alkaloid which has on several previous occasions been isolated from post-mortem specimens, mostly from the South, and which has never been identified



Experiments have also been carried out on certain aspects of the toxicology of tetramine, the main toxic principle of *Courbonia* spp., principally from the point of view of being able to detect it in the organs after death produced by it. Although it is readily detectable in the urine both before and after death all attempts so far made to detect it in the organs themselves have so far failed. There is no doubt that in cases of suspected *Courbonia* poisoning—and all cases from areas in which the plant grows should be such—the most useful organ to submit would be the bladder together with any urine remaining in it. Even with a few drops only a good positive reaction with Wagner's reagent can be obtained. So far, on more than one occasion since the discovery of its toxic nature, *Courbonia* has been the suspected cause of death, but proof has unfortunately been lacking.

### Sudan Seed Oils.

The survey of Sudan Seed Oils has been further extended by the detailed examination of four seeds from the South, viz. *Hyptis spicigera*, *Luffa cylindrica*, *Citrullus vulgaris* (inedible melon) and *Lagenaria vulgaris*.

Also a preliminary examination of the oil of the seeds of *Ammi visnaga*, used extensively as a diuretic in Egypt, was carried out.

### Stillbamidine.

Although many interesting problems regarding this drug still await solution there has been no opportunity during the year under review to carry out any further work on them.

## CHAPTER XI.

### THE KITCHENER SCHOOL OF MEDICINE.

DR. R. B. U. SOMERS.

#### General.

On the recommendation of Dr. H.E.A. Boldero, M.A., D.M., F.R.C.P., Visitor from the Royal Colleges, for the Final Professional Examinations held in January 1948, recognition by the Committee of Management was continued for a further year from 1st January 1948.

The Council of the Royal College of Physicians of Edinburgh have informed us that they are prepared to recognise the Diploma of the Kitchener School of Medicine for the purposes of the examination for the Membership of their College.

During 1948 the following graduates have been engaged in Post Graduate study in the United Kingdom :—

Dr. Mohamed Amin El Sayed, D.K.S.M. (1928) for D.T.M. and H.  
Dr. Ali Mohamed Kheir, D.K.S.M. (1929) for D.T.M. and H.  
Dr. Ahmed Ali Zaki, D.K.S.M. (1931) for D.T.M. and H.  
Dr. Sayed Abdel Razig, D.K.S.M. (1932) for D.T.M. and H.  
Dr. Mamoun Hussein Sherif, D.K.S.M. (1932) for Study of Tuberculosis.  
Dr. Abdel Halim Mohamed, D.K.S.M. (1933) for M.R.C.P.  
Dr. Abdulla Omer Abu Shamma, D.K.S.M. (1933) for D.P.H.  
Dr. Abdel Hamid Bayoumi, D.K.S.M. (1934) for F.R.C.S. Ed.  
Dr. Tigani El Mahi, D.K.S.M. (1935) for D.P.M.

It is with great regret that I have to record the untimely death of Dr. Ali Ibrahim Bashir which occurred at Port Sudan on 5.12.1948. Dr. Ali was a Medical Officer in the Sudan Medical Service which he joined on his graduation from the School in January 1935. He was beloved by all his colleagues and will greatly be missed by them.

In 1948 the period to be spent in premedical studies at the School of Science was reduced from eighteen months to twelve months. The six months so saved will be added to the period for clinical study.

#### Number of Medical Students :

School of Science	12	
School of Medicine	11	Preclinical
	5	Junior Clinical.

As from January 1949 an annual intake of 12 students will commence in the Medical School.



## Professional Examinations.

*Anatomy.* Eleven candidates were examined in Anatomy of whom nine passed and two failed and were referred for three months. The examiner was Dr. N. Slade, M.B., Ch.B.

*Physiology.* Eleven candidates were examined in Physiology nine reached the required standard and two were referred for three months. The examiner was Dr. J. S. Aldridge, M.R.C.S., L.R.C.P.

*Pathology.* Five candidates sat for the examination in Pathology and all passed. The examiner was Dr. R. Kirk, O.B.E., M.D., M.R.C.P.

*Public Health.* Five candidates sat for the examination in Public Health four reached the required standard and one was referred for three months. The examiner was Dr. H. M. Elliott, M.B., B.Ch., D.P.H.

## Prizes.

The following prizes were awarded :—

The Anatomy Prize	..	..	..	..	Fuad Abdu
The Physiology Prize	..	..	..	..	Fuad Abdu
The Jackson Prize in Pathology	..	..	..	..	Lewis Abdu
The Balfour Prize in Public Health	..	..	..	..	Lewis Abdu

## The Visitor.

Owing to unforeseen circumstances the arrival of the Visitor from the Royal Colleges of Physicians and Surgeons England was postponed and the Professional Examinations were held in his absence in January 1949.

It is hoped that Mr. H.S. Souttar, O.B.E., D.M., M.Ch., F.R.C.S., will visit the School in March 1949. Afterwards he will submit his report to the Committee of Management of the Royal Colleges.

## Post Graduate Course.

No post graduate classes were held during the year.

## Teaching Staff.

During the year the School lost the services of the following distinguished lecturers all on retirement :—

- Dr. A. Cruickshank, O.B.E., M.D., in Medicine.
- Dr. A. E. Lorenzen, D.P.H., in Public Health and Forensic Medicine.
- Dr. J. S. Hovell, F.R.C.S.E., F.R.C.O.G., in Obstetrics and Gynaecology.
- Dr. A. R. McKelvie, D.O., D.O.M.S., in Ophthalmology.

The following lecturers were appointed :—

- Dr. R. M. Buchanan, M.D., D.T.M. and H., in Medicine.
- Dr. H. Richards, D.P.H., D.T.M. and H., in Public Health, Social Medicine and Nutrition.
- Dr. J. L. D. Roy, D.R.C.O.G., in Obstetrics and Gynaecology.
- Dr. H. M. Elliott, D.P.H., in Forensic Medicine.

Dr. Hussein Ahmed Hussein, in Ophthalmology.

Dr. N. Slade, M.B., Ch.B., in Anaesthetics.

Dr. W. F. Townsend-Coles, M.D., D.C.H., in Children's Diseases.

### **Administration.**

Dr. A. E. Lorenzen, Chairman of the School Council resigned on retirement and Dr. E. P. Pratt was appointed in his place.

Drs. A. Cruickshank and J. S. Hovell resigned from the School Council on retirement and Drs. R. M. Buchanan and J. L. D. Roy were appointed by the Executive Committee in their stead.

Dr. R. M. Buchanan resigned as Dean of the School and as Hon. Secretary to the Executive Committee and the General Board on his appointment as Senior Physician, Sudan Medical Service and Dr. R. B. U. Somers was elected as his successor.

### **Library.**

Fifty one new books were added to the library which now contains 1,729 volumes. During the year 271 books were lent to civil and service practitioners and students.

### **Pathological Museum.**

In 1948 several new specimens were added to the museum and some of the older ones remounted.

### **Graphic Museum.**

This continues to be of great use and is a general attraction. It is open to the Public. The School of Hygiene classes are held in the museum. 5,968 recorded visits were noted for the year (3,921 in 1947). Models, posters and exhibits are sent to health centres and agricultural shows throughout the country. Dr. H. M. Elliott is the Curator.

### **Students' Hostel.**

The roof was resurfaced and the whole of the interior repaired and redecorated.

### **Health.**

The health of the students was good throughout the year.



## CHAPTER XII.

### THE S.M.S. SCHOOL OF HYGIENE.

The school is accommodated at the S.M.S. Graphic Museum and also has accommodation at the Khartoum Public Health Offices.

The Graphic Museum provides training and demonstration matter and practical work is carried out in Khartoum City and the Province Rural District. Visits are also paid to the Suakin Quarantine, the Gezira Irrigated Area and the Medical Entomological Section of the Research Division.

The staff of the School consists of the Principal, who is also Asst. Chief Public Health Inspector, and an assistant to the Principal, who is a Sudanese Public Health Inspector. Four Boards of Studies in association with the School control the syllabus and curriculum, the selection of candidates, the appointment of teachers and examiners and the examinations in each of the four categories of staff, Public Health Officers (for certificates of the Royal Sanitary Institute), Sanitary Overseers, House-to-House Inspectors and Mosquito men, though these last two groups are for the most part trained in their own areas on syllabi prepared at the School. The Boards report to the Director, Sudan Medical Service, and in each case the Chairman is the Assistant Director, Public Health and the Secretary, the Principal of the School.

The basis of education on which training is superimposed is that of the 4th Year Intermediate School standard, and the desirable transition is from House-to-House Inspector to Sanitary Overseer. The better educated and more successful Overseers may progress to selection for the course for Public Health Officers for which category also candidates of higher basis education, without previous practical experience in hygiene, may be considered.

#### Mosquito men.

These men are trained by Sanitary Overseers and Public Health Officers in the localities in which they are employed. All such staff are Sudan Medical Service personnel.

#### House-to-House Inspectors.

These are with few exceptions employees of local government authorities and training is carried out locally by the senior public health official in the area other than in the 3 towns, and here the trainees undergo regular courses of instruction at the School of Hygiene.

The subjects taught are on a curriculum prepared at the School of Hygiene, and cover personal hygiene, inspection procedure, housing, food preparation and manufacture, disposal of waste matter, entomology and its applications, prevention of disease, and sanitary law.

#### Sanitary Overseers.

These are Sudan Medical Service officials, and candidates may be drawn from any category provided the person has an adequate educational qualification.

The training course lasts one year. The curriculum is that of the House-to, House Inspectors in more detail and extended to include, control of foodstuffs water supplies, hygiene of schools, communicable disease, methods of disinfection-village sanitation, office routine.

### **Public Health Officers.**

Students are drawn from selected Sanitary Overseers and other, by record of service, examination, and interview. The course is of three years and the qualifying examination is that of the Royal Sanitary Institute.

The curriculum is as follows :—

- 1st Year : General Science, Arithmetic, Geometry and English at the Omdurman Technical School.
- 2nd Year : Entomology and pest control, helminthology, protozoology, bacteriology, water supplies, disposal of waste matter.
- 3rd Year : Foodstuffs, nutrition, meat inspection, milk, food preparation and manufacture, housing, urban and rural planning, communicable diseases, school health, prison health, quarantine, air port and sea port control, vital statistics, and sanitary law.

### **PROGRESS DURING 1948.**

#### **Public Health Officers' Course.**

During the year 15 Public Health Officer Students were under training, as follows :—

1st Year	5
2nd Year	4
3rd Year	6 (Four for 3 months only prior to final examination).

In March four students who had completed their course of training sat for, and were successful in passing, the final examination of the Royal Sanitary Institute for Sudanese Public Health Officers.

#### **House-to-House Inspectors.**

Fortytwo inspectors from the three Towns were given courses of training and demonstrations.

Eighteen were promoted to and classified in the Sanitary Overseers Cadre after successfully completing their training and passing a final examination.

#### **Sanitary Overseers.**

A shortened and intensive course was given to the 18 newly appointed Sanitary Overseers. This consisted of lectures and practical work at the School of Hygiene and practical work under the Medical Entomologist at Wad Medani.

#### **Medical Assistants.**

Classes from the Medical Assistants course in Omdurman received instruction throughout the year. Lectures and demonstrations numbered



**Health Visitors.**

Ten lectures on public health subjects were given to 4 Health Visitors students.

**School of Administration.**

Ten lectures on public health were given to the Students of the School.

**Sudan Defence Force Cadets.**

Thirteen Officer cadets of the Sudan Defence Force were given four lectures on various public health subjects during the month of April.

## CHAPTER XIII.

### THE OMDURMAN MIDWIVES TRAINING SCHOOL.

The School has trained 544 midwives since 1921 and 404 have actually been in practice in 1948. Of these 404, 365 were practising as district midwives, 32 were also trained nurses working in hospitals and 7 were health visitors.

During the year 14 were struck off the register, one resigned, one was reinstated after a 'refresher' course and six were suspended from work.

TABLE 56.

*Distribution of Trained Midwives: 1948.*

PROVINCE	Newly licensed	Licence cancelled	TRANSFERRED		Died	TOTAL remaining
			to	from		
Blue Nile .. ..	8	1	1	—	—	91
Darfur .. ..	6	—	1	—	—	18
Equatoria .. ..	—	—	—	—	—	—
Kassala .. ..	6	2	1	—	—	38
Khartoum .. ..	5	2	2	1	—	106
Kordofan .. ..	2	2	—	—	—	49
Northern .. ..	2	7	1	1	—	96
Upper Nile .. ..	2	1	1	—	—	6
TOTALS .. ..	31	15	7	2	—	404

There were 36 pupils in residence in training in December 1948 and 31 were granted certificates after examination.

Eleven midwives were given a refresher course.



TABLE 57.

*Omdurman Midwifery Service : 1948.**Cases seen by Midwives School : Deliveries and Complications.*

DETAILS OF CASES	Number of Cases attended		Total
	By School Staff	By Town Midwives	
Cases delivered at home .. .. .	770	2,312	3,082
Abortions .. .. .	1	17	18
Transferred to hospital .. .. .	14	54	68
Prolonged 2nd. stage .. .. .	6		
Uterine inertia .. .. .	2		
Eclampsia .. .. .	2		
Pre-eclamptic toxæmia .. .. .	6		
Placenta Praevia .. .. .	1		
Breech in primipera .. .. .	3		
Vomiting and shock following a fall .. .. .	1		
Tuberculosis .. .. .	1		
Brow presentation .. .. .	1		
Still births in utero .. .. .	2		
Prolapsed cord .. .. .	1		
Face presentation .. .. .	1		
Breech with extended legs died in utero .. .. .	1		
Ante-partum insanity .. .. .	1		
Had two previous Caesarean sections .. .. .	1		
Carneous mole .. .. .	1		
Illegitimate pregnancy .. .. .	1		
Dysentery .. .. .	1		
Hepatitis .. .. .	1		
Narrow Pelvis .. .. .	1		
Ante partum hæmorrhage .. .. .	1		
Delayed labour .. .. .	1		
"    "    (twins) .. .. .	1		
No record made .. .. .	30		
Cases attended .. .. .	785	2,383	3,168
TOTAL BIRTHS IN HOMES .. .. .	770	2,312	3,082
(a) Live Births .. .. .	765	2,249	3,004
(b) Still births .. .. .	15	63	78
Twins .. .. .	9	24	33
Triplets .. .. .	—	—	—
Post-partum complications .. .. .	37	—	37
Retained Placenta .. .. .	—	—	—
P.P.H. Attended by doctor .. .. .	3	—	3
P.P.H. attended by midwives .. .. .	15	(No record)	15
Puerperal pyrexia.. .. .	3	(available)	3
Simple puerperal pyrexia .. .. .	10	—	10
Prexia after hæmorrhage .. .. .	1	—	1
Phlegamsia Alba .. .. .	1	—	1
Baby premature .. .. .	1	—	1
Baby with syphilitic lesions .. .. .	1	—	1
Baby born with imperforate anus .. .. .	1	—	1
Baby with bi-lateral cephalhæmatoma .. .. .	1	—	1
Transferred to Hospital .. .. .	14	54	68

There are ante-natal clinics at the Midwives School and at the Murada Welfare Centre. Expectant mothers are seen twice at each. Figures for the year 1948 were :—

TABLE 58.

CLINICS	New Cases		Old Cases		TOTAL	
	1947	1948	1947	1948	1947	1948
Midwives' School Clinic .. ..	2,752	2,658	3,862	4,466	6,614	7,124
Murada Clinic .. .. .	643	1,731	1,687	759	2,330	2,490



## CHAPTER XIV.

### OTHER TRAINING.

#### MEDICAL ASSISTANTS.

There were 18 specially selected hospital attendants in the course for medical assistants in Omdurman Civil Hospital.

The course lasts twelve months and is designed to train medical assistants for the dispensaries of the Northern Sudan.

There were 21 trainees in the School at Juba Hospital. This School trains medical assistants, sanitary overseers and laboratory assistants, for the Southern Sudan.

At the Central Nurses' Training School in Omdurman Civil Hospital, there were 22 nurses under training and 9 completed their three years course and passed the final examination.

## CHAPTER XV.

### THE S.M.S. GRAPHIC MUSEUM 1948.

1. The duties of Curator of the Museum were assumed by Dr. H. M. Elliott, Assistant Director (Public Health) in November 1948. There were no other changes of staff.

2. As in the past the teaching facilities which the Museum affords were taken advantage of by all students of the School of Hygiene, by the senior class of medical students, medical assistants and junior hospital staff.

3. Talks and demonstrations on hygiene were given to the pupils of secondary and elementary schools on 21 occasions at the Graphic Museum.

4. Recorded visits to the Museum by the general public during the year were 5968 and an increase of 2047 over 1947. Figures for previous years are 1947—3921, 1946—3799, 1945—3069.

5. The Malaria Section was completely re-organised, revised, and additional material added during the year. Normal maintenance and revision work was carried out in all other sections.

New leaflets on Malaria, Bilharzia and Relapsing Fever in Arabic were prepared, and 5000 copies of each printed, for general distribution through the medium of the Graphic Museum and the various Health Shows.

6. Four special boxes containing models, slogans, posters, leaflets etc., the basis of health exhibits, were prepared in 1948 and sent to shows at Wadi Halfa, Abu Guta, Kassala, Sennar and Wad Medani. A special effort was made to prepare for Wad Medani an exhibit fully representative of the Department's activities in the public health sphere; a large amount of special material was made and, in addition, models were loaned from the Graphic Museum. The Assistant Curator visited Wad Medani and assisted and advised in the setting up of the exhibit.

7. Much repair and general maintenance work was carried out at the Kitchener School of Medicine and Students Hostel entailing the use of Museum carpenters for approximately 240 man hours.

Printing work of a minor nature was done for the Kitchener School of Medicine Khartoum Civil Hospital, and S.M.S. Headquarters.

Three hundred blue prints of various types of approved premises were prepared for distribution by Headquarters during the year.

#### 8. Rural Health Centres and Dispensaries.

Material prepared and despatched :



### Exhibits.

Snails—types and set up in boxes	..	..	..	..	..	11
----------------------------------	----	----	----	----	----	----

### Models.

Incinerators	..	..	..	..	..	8
Pit latrines —Southern type	..	..	..	..	..	4
„ „ —Northern type	..	..	..	..	..	4
„ „ —Omdurman type	..	..	..	..	..	4
Village —Insanitary and bad layout	..	..	..	..	..	1
„ —Approved layout	..	..	..	..	..	1

### Posters.

Various —Framed and glazed, or varnished	..	..	..	12
--	----	----	----	----

## 9. Permanent Exhibition.

The following material was added during 1948 :

Photographs	..	..	..	..	33
Charts and Graphs	..	..	..	..	5
Drawings	..	..	..	..	6
Models	..	..	..	..	1
Specimens	..	..	..	..	4
Descriptive notes	..	..	..	..	4

The exhibition now comprises :

Photographs	..	..	..	..	2111
Charts	..	..	..	..	228
Drawings	..	..	..	..	110
Descriptive notes	..	..	..	..	247
Maps	..	..	..	..	70
Posters	..	..	..	..	12
Models	..	..	..	..	163
Specimens	..	..	..	..	611

10. The Sections of the Museum are:

- |                               |                                 |
|-------------------------------|---------------------------------|
| 1. Malaria                    | 28. Dengue                      |
| 2. Trypanosomiasis            | 29. Typhus                      |
| 3. Leishmaniasis              | 30. Quarantine                  |
| 4. Syphilis                   | 31. Phlebotomus Fever           |
| 5. Yaws                       | 32. Disinfection                |
| 6. Relapsing Fever            | 33. Meteorology                 |
| 7. Filariasis                 | 34. Water                       |
| 8. Diphtheria                 | 35. Influenza                   |
| 9. Ancylostomiasis            | 36. Pneumonia                   |
| 10. Schistosomiasis           | 37. Dysentery                   |
| 11. Madura Disease            | 38. Enteric Fever               |
| 12. Nutrition                 | 39. Maternity and Child Welfare |
| 13. Tuberculosis              | 40. School Medical Service      |
| 14. Gonorrhoea                | 41. Disposal of Waste Matter    |
| 15. Cholera                   | 42. Town Planning               |
| 16. Tetanus                   | 43. Housing                     |
| 17. Anthrax                   | 44. Undulant Fever              |
| 18. Cerebro-spinal meningitis | 45. Blackwater Fever            |
| 19. Plague                    | 46. Eye Diseases                |
| 20. Rabies                    | 47. Medical Entomology          |
| 21. Leprosy                   | 48. Skin Disease                |
| 22. Measles                   | 49. Folk Medicine               |
| 23. Mumps                     | 50. Venomous snakes             |
| 24. Yellow Fever              | 51. Historical medicine         |
| 25. Smallpox                  | 52. Propaganda                  |
| 26. Chickenpox                | 53. Rural Health                |
| 27. Vaccinia                  | 54. Hydatid Disease             |



TABLE I.  
STAFF OF SUDAN MEDICAL SERVICE.  
ESTABLISHMENT OF CLASSIFIED OR CERTIFICATED OFFICIALS

CATEGORY	ESTABLISHMENT		
	British	Sudanese	Others
<b>Headquarters.</b>			
Director .. .. .	1	—	—
Assistant Director (Public Health) .. .. .	1	—	—
Assistant Director (Hospitals) .. .. .	1	—	—
D.A.D. (Quarantine) .. .. .	—	1	—
Controller of Medical Stores .. .. .	1	—	—
Principal Matron .. .. .	1	—	—
Superintendent .. .. .	1	—	—
Chief Public Health Inspector .. .. .	1	—	—
A/Chief Public Health Inspector .. .. .	1	—	—
Head Staff Clerk .. .. .	—	1	—
Staff Clerks .. .. .	—	2	—
Clerks .. .. .	—	24	—
Head Accountant .. .. .	1	—	—
Accountants .. .. .	—	2	—
Book-keepers .. .. .	—	20	—
Superintendent of Stores .. .. .	1	—	—
Asst. Superintendent of Stores .. .. .	—	—	1
Storekeepers .. .. .	—	10	—
Stores Supervisors .. .. .	—	3	—
<b>Hospitals and Dispensaries.</b>			
Senior Physician .. .. .	1	—	—
Senior Surgeon .. .. .	1	—	—
Gynaecologist .. .. .	1	—	—
Ophthalmologist .. .. .	1	—	—
Medical Inspector .. .. .	27	16	—
Medical Officers (Special Duties) .. .. .	6	—	—
Dental Officer .. .. .	1	—	—
Assistant Ophthalmologist .. .. .	—	1	—
Radiographer .. .. .	1	—	—
Pharmaceutical Registrar .. .. .	—	—	1
Asst. Surgical Registrar .. .. .	—	1	—
Asst. Obstetrical Registrar .. .. .	—	1	—
Medical Officers .. .. .	—	66	—
Housemen (recent graduates) .. .. .	—	7	—
Medical Assistants .. .. .	—	388	—
Matron, Khartoum Civil Hospital .. .. .	1	—	—
Matron, Omdurman, Nurses School .. .. .	1	—	—
Charge Sister .. .. .	11	—	—
Nursing Sister .. .. .	15	—	—
Charge Nurses .. .. .	—	5	—
Staff Nurses .. .. .	—	19	—
Dental Mechanic .. .. .	1	—	—
Assistant Radiographers .. .. .	—	9	—
Asst. Radiographer under training .. .. .	—	1	—
Pharmacists .. .. .	—	1	—
Dispensers .. .. .	—	14	—
Dispensers under training .. .. .	—	3	—
Book-keepers .. .. .	—	83	—
Clerks .. .. .	—	28	—
Hors Cadre Southern Trainees (I/11 Status) .. .. .	—	8	—
Hors Cadre Tutor (Scale K1 Status) .. .. .	—	—	—
Storekeepers .. .. .	—	10	—
Southern Storekeepers .. .. .	—	7	—
Head Mumarid .. .. .	—	31	—
Theatre Attendant, Male .. .. .	—	23	—
Quarantine Overseer .. .. .	—	1	—
<i>Carried forward</i>	78	786	2

CATEGORY	ESTABLISHMENTS		
	British	Sudanese	Others
<i>Brought forward</i> .. ..	78	786	—
<b>Public Health.</b>			
Medical Officer of Health, Khartoum .. ..	1	—	—
Asst. Medical Officer of Health Khartoum .. ..	—	1	—
A/Medical Officer of Health (Special Duties) .. ..	1	—	—
Senior Public Health Inspectors .. ..	3	—	—
Public Health Inspectors .. ..	3	5	—
Public Health Officers .. ..	—	24	—
Sanitary Overseers .. ..	—	118	—
Principal, Midwives School .. ..	1	—	—
Charge Sister .. ..	1	—	—
Supervisor of Health Visitors .. ..	1	—	—
Clerks .. ..	—	5	—
Senior Staff Midwives .. ..	—	2	—
Staff Midwives .. ..	—	6	—
Staff Health Visitors .. ..	—	2	—
Health Visitors .. ..	—	12	—
<b>Research and Laboratory Service.</b>			
<b>Stack Medical Research Laboratories.</b>			
Asst. Director (Research) S.M.S. .. ..	1	—	—
Bacteriologist.. ..	1	—	—
Assistant Bacteriologist .. ..	—	1	—
Senior Laboratory Assistant .. ..	1	—	—
Laboratory Assistants .. ..	3	47	—
Head Laboratory Attendants .. ..	—	2	—
Clerks .. ..	—	3	—
Junior Technical Assistant .. ..	—	1	—
<b>Medical Entomology.</b>			
Senior Scientific Officer .. ..	1	—	—
Technical Assistants .. ..	—	3	—
Clerk .. ..	—	1	—
Aedes Control Officer .. ..	—	1	—
<b>Wellcome Chemical Laboratories.</b>			
Scientific Officers .. ..	2	—	—
Technical Assistants .. ..	—	5	—
Junior Technical Assistants .. ..	—	2	—
Clerk .. ..	—	1	—
<b>Kitchener School of Medicine.</b>			
Registrar (Dean) .. ..	1	—	—
Library Clerk .. ..	—	—	1
Asst. Curator.. ..	—	1	—
<b>S.M.S. Graphic Museum.</b>			
Museum Attendants.. ..	—	3	—
<b>TOTALS</b> .. ..	93	1042	2

The unclassified employees number approximately 4,200.



TABLE II (a).

**INCOME AND EXPENDITURE OF THE S.M.S. OVER THE LAST  
FOUR YEARS.**

ITEMS	1945	1946	1947	1948
	£E.	£E.	£E.	£E.
<i>Revenue</i> .. .. .	67,839	70,537	68,775	54,393
<i>Expenditure :</i>				
Personnel and Personal Allowances ..	278,714	285,662	453,703	537,691
Services .. .. .	198,596	296,451	340,841	348,891
Extraordinary .. .. .	4,576	7,273	11,846	8,837
<b>TOTALS</b> .. .. .	<b>481,886</b>	<b>589,386</b>	<b>806,390</b>	<b>895,419</b>

TABLE II (b).

**ANALYSIS OF THE S.M.S. EXPENDITURE IN 1948.**

ITEMS	Personnel	Services	Extraordinary	TOTAL
	£E.	£E.	£E.	£E.
Headquarters .. .. .	40,295	48,714	8,837	97,846
Hospitals and Dispensaries .. .. .	332,116	262,656	—	644,772
Hygiene and Public Health .. .. .	87,877	34,961	—	122,838
Research .. .. .	25,263	2,560	—	27,823
Graphic Museum .. .. .	621	—	—	621
Kitchener School of Medicine .. .. .	1,519	—	—	1,519
<b>TOTALS</b> .. .. .	<b>537,691</b>	<b>348,891</b>	<b>8,837</b>	<b>895,419</b>



TABLE III.

SUDAN : 1948.

## ADMISSIONS AND DEATHS BY DISEASES.

DISEASES	BAHR-EL GHAZAL		BLUE NILE		DARFUR		EQUATORIA		KASSALA		KHARTOUM		KORDOFAN		NORTHERN		UPPER NILE		TOTAL		
	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	Cases	Deaths	
1. T. B. Pulmonary .. ..	84	9	288	59	31	13	63	10	169	28	304	39	80	17	137	9	62	9	1,218	193	1
2. T. B. Non-Pulmonary ..	28	4	125	15	12	1	18	—	72	4	213	12	71	1	81	7	59	1	679	45	2
3. Syphilis .. ..	547	—	814	6	5,788	21	3,292	6	410	1	262	4	1,395	2	274	1	1,931	—	14,713	41	3
4. Gonorrhoea .. ..	779	—	780	—	605	2	871	2	785	—	212	—	764	1	240	1	148	—	5,184	6	4
5. Soft Sore .. ..	23	—	29	—	40	—	23	—	46	—	95	—	21	—	2	—	15	—	294	—	5
6. Trachoma .. ..	5	—	91	—	98	—	17	—	32	—	24	—	24	—	103	—	48	—	442	—	6
7. All other Eye diseases ..	189	—	351	—	282	—	458	—	226	—	1,129	—	311	—	542	—	963	—	4,451	—	7
8. Ear .. ..	54	—	82	1	48	—	103	1	51	—	32	—	65	—	56	1	22	—	513	3	8
9. Skin .. ..	319	—	254	2	263	—	408	—	105	—	182	—	186	—	151	2	87	—	1,955	4	9
10. Wounds and other injuries..	1,818	16	3,269	49	2,952	45	3,753	44	2,177	24	1,940	10	3,087	64	1,581	19	1,342	17	21,919	288	10
11. Tumours Malignant .. ..	1	—	51	12	23	4	31	3	45	1	91	8	39	6	23	4	11	—	315	38	11
12. Tumours Non-Malignant ..	13	—	54	2	26	2	34	—	39	1	66	—	23	6	33	—	10	1	298	12	12
13. Gynaecological .. ..	17	—	605	8	102	1	39	1	185	1	553	9	147	1	253	1	57	—	1,958	22	13
14. Confinements .. ..	90	1	363	15	79	9	93	4	115	7	603	6	187	11	107	7	49	2	1,686	62	14
15. Poisoning .. ..	6	—	38	11	43	10	2	1	14	2	24	1	48	6	19	2	—	—	194	33	15
16. Ancylostomiasis .. ..	389	12	7	3	65	2	3,103	23	6	—	6	—	5	—	45	—	31	—	3,657	40	16
17. Bilharziasis .. ..	54	—	416	19	94	1	1,477	6	55	—	121	1	165	1	163	2	13	—	2,558	30	17
18. Blackwater Fever .. ..	—	—	3	2	—	—	2	1	1	—	—	—	1	—	1	—	3	2	11	5	18
19. Dysentery, Amoebic .. ..	315	17	457	11	626	18	286	10	486	12	294	6	573	17	237	2	116	4	3,390	97	19
20. Dysentery, Bacillary ..	25	2	93	2	9	1	62	3	66	2	188	2	49	6	31	2	28	—	551	20	20
21. Filariasis .. ..	87	—	—	—	—	—	136	—	14	—	1	—	—	—	—	—	—	—	238	—	21
22. Madura disease .. ..	—	—	104	—	18	—	—	—	25	—	72	—	18	1	34	—	1	—	272	1	22
23. Malaria .. ..	643	5	3,053	60	795	8	1,890	35	1,257	39	1,205	9	2,128	25	1,193	10	382	5	12,546	196	23
24. Leishmaniasis .. ..	—	—	75	12	5	—	30	1	310	42	8	3	21	—	4	—	7	4	460	62	24
25. Trypanosomiasis .. ..	—	—	—	—	—	—	75	4	—	—	—	—	—	—	—	—	—	—	75	4	25
26. Yaws .. ..	834	5	1	—	1	—	2,358	3	—	—	—	—	—	—	1	—	322	3	3,517	11	26
27. Heat Stroke .. ..	—	—	—	—	—	—	—	—	—	—	9	—	3	—	—	—	1	—	13	—	27
28. Dracontiasis .. ..	193	2	25	—	4	—	311	1	16	1	7	—	83	1	8	—	19	—	666	5	28
29. Tropical Ulcer .. ..	1,931	8	236	—	171	—	2,969	6	33	—	12	—	1,797	—	9	—	400	—	7,558	14	29
30. Anthrax .. ..	—	—	—	—	—	—	—	—	6	—	—	—	—	—	—	—	—	—	6	—	30
31. Cerebrospinal Meningitis ..	38	14	9	—	7	4	76	29	2	2	4	2	4	—	2	2	8	6	150	59	31
32. Chickenpox .. ..	153	—	346	—	480	—	255	1	201	—	220	1	425	2	100	—	176	—	2,356	4	32
33. Dengue .. ..	—	—	—	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	1	—	33
34. Diphtheria .. ..	1	—	65	—	7	3	3	—	26	2	89	6	26	8	34	10	2	2	253	31	34
35. Enteric Fever .. ..	—	—	43	—	5	1	5	1	18	2	50	3	4	—	54	6	13	2	192	15	35
36. Erysipelas .. ..	—	—	2	—	—	—	—	—	—	—	1	—	—	—	4	1	—	—	7	1	36
37. Gastro Enteritis of Children	9	—	57	5	10	1	507	22	171	5	190	38	14	5	82	25	19	1	1,059	102	37
38. Influenza .. ..	30	—	1	—	74	—	72	4	74	—	85	1	26	—	13	—	1	—	376	5	38
39. Leprosy .. ..	45	—	12	1	14	3	43	—	—	—	10	—	4	—	4	—	5	—	137	4	39
40. Undulant Fever .. ..	—	—	12	1	—	—	5	—	22	—	4	—	6	—	1	—	1	—	51	1	40
41. Measles .. ..	153	2	185	2	192	2	126	—	161	—	97	1	533	10	35	3	42	—	1,524	20	41
42. Mumps .. ..	33	—	61	2	76	1	20	—	17	—	13	—	57	—	7	—	4	—	288	3	42
43. Pellagra .. ..	—	—	1	—	—	—	1	—	—	—	—	—	—	—	—	—	—	—	2	—	43
44. Peurperal Fever .. ..	—	—	20	1	5	—	—	—	5	—	10	—	6	2	17	1	3	—	66	4	44
45. Phlebotomus Fever .. ..	—	—	2	2	—	—	—	—	—	—	4	—	—	—	—	—	—	—	6	2	45
46. Pneumonia .. ..	310	16	1,130	96	370	31	913	68	678	52	1,103	41	491	50	565	43	220	12	5,780	409	46
47. Rabies .. ..	—	—	4	4	1	1	—	—	1	1	1	1	3	3	—	—	—	—	10	10	47
48. Relapsing Fever .. ..	—	—	52	1	50	1	—	—	19	6	24	—	31	—	8	—	87	—	271	8	48
49. Acute Rheumatism .. ..	18	—	28	—	8	—	33	—	12	—	26	—	17	1	60	—	1	—	203	1	49
50. Smallpox .. ..	25	3	9	4	4	1	10	—	152	20	3	1	1,052	99	3	—	33	3	1,291	131	50
51. Tetanus .. ..	15	6	23	11	—	—	5	3	5	4	8	4	5	1	4	3	3	1	68	33	51
52. Whooping Cough .. ..	7	—	9	1	18	—	15	1	14	—	32	1	32	1	35	2	26	1	188	7	52
53. Circulatory System .. ..	51	10	295	56	85	14	251	18	169	17	448	16	172	41	311	27	42	12	1,824	211	53
54. Respiratory System .. ..	383	11	579	10	170	5	541	6	428	5	381	3	896	43	461	8	208	3	4,047	94	54
55. Alimentary System .. ..	612	18	1,577	101	525	34	1,324	34	985	68	1,056	13	1,071	90	984	47	401	22	8,535	427	55
56. Genito-Urinary System ..	64	1	500	21	168	11	88	—	298	6	334	5	379	19	352	14	38	1	2,221	78	56
57. Nervous System .. ..	15	1	88	21	33	7	15	—	66	1	191	5	64	3	95	3	18	2	585	43	57
58. Scurvy .. ..	—	—	7	—	1	—	2	2	13	—	3	—	11	1	5	—	—	—	42	3	58
59. Diabetes .. ..	1	1	44	1	5	1	1	—	24	1	69	3	7	2	39	2	—	—	190	11	59
60. Fever of uncertain origin ..	76	—	250	42	145	12	52	7	353	18	406	3	103	21	382	12	90	7	1,857	122	60
61. All other diseases .. ..	2,008	18	1,006	25	390	5	2,024	28	838	15	424	3	2,861	27	650	5	697	7	10,896	133	61
<b>Total .. ..</b>	<b>12,491</b>	<b>182</b>	<b>18,081</b>	<b>697</b>	<b>15,023</b>	<b>276</b>	<b>28,292</b>	<b>389</b>	<b>11,498</b>	<b>390</b>	<b>12,939</b>	<b>261</b>	<b>19,591</b>	<b>595</b>	<b>9,635</b>	<b>284</b>	<b>8,265</b>	<b>130</b>	<b>135,813</b>	<b>3,204</b>	
<b>Missions .. ..</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>330</b>	<b>12</b>	<b>—</b>	<b>—</b>	<b>1,878</b>	<b>94</b>	<b>2,282</b>	<b>—</b>	<b>—</b>	<b>—</b>	<b>206</b>	<b>—</b>	<b>4,698</b>	<b>106</b>	
<b>Grand Total .. ..</b>	<b>12,491</b>	<b>182</b>	<b>18,081</b>	<b>697</b>	<b>15,023</b>	<b>276</b>	<b>28,622</b>	<b>401</b>	<b>11,498</b>	<b>390</b>	<b>14,817</b>	<b>355</b>	<b>21,873</b>	<b>595</b>	<b>9,635</b>	<b>284</b>	<b>8,471</b>	<b>130</b>	<b>140,511</b>	<b>3,310</b>	



TABLE IV.  
OUT-PATIENTS.  
NEW CASES BY DISEASES.  
AND  
TOTAL ATTENDANCES.

DISEASE	BAHR EL GHAZAL	BLUE NILE	DARFUR	EQUATORIA	KASSALA	KHARTOUM	KORDOFAN	NORTHERN	UPPER NILE	TOTAL
1. T.B. Pulmonary ..	86	452	39	63	302	366	123	321	121	1,873
2. T.B. Non-Pulmonary ..	28	457	13	18	206	442	124	219	67	1,574
3. Syphilis ..	1,195	18,194	20,381	6,192	9,060	5,466	22,897	5,470	14,489	103,344
4. Gonorrhoea ..	1,169	5,273	2,397	2,011	3,720	4,136	3,903	1,332	967	24,908
5. Soft Sore ..	23	1,198	304	203	521	512	201	10	80	3,052
6. Trachoma ..	159	46,537	6,187	566	13,066	80,550	6,120	41,652	2,049	196,886
7. All Other Eye diseases	6,045	112,583	16,208	29,412	42,427	138,629	96,483	40,180	17,213	499,180
8. Ear ..	1,877	21,869	4,898	5,041	3,554	9,545	16,469	14,724	2,410	80,387
9. Skin ..	5,275	21,203	9,200	38,951	10,066	7,538	18,082	6,810	3,554	120,679
10. Wounds and other injuries ..	26,819	159,039	43,270	77,953	6,129	78,118	83,694	60,033	22,470	557,525
11. Tumours Malignant	4	100	23	31	48	91	142	67	12	518
12. Tumours Non-Malignant										
13. Gynaecological ..	15	3,167	118	43	255	66	136	257	16	4,073
14. Confinements ..	18	718	124	39	700	2,340	958	893	92	5,882
15. Poisoning ..	90	511	135	93	117	611	195	106	63	1,921
16. Ancylostomiasis ..	6	33	76	11	24	24	129	156	—	464
17. Bilharziasis ..	1,027	7	113	4,338	6	6	36	108	45	5,686
18. Blackwater Fever	211	5,557	1,613	1,986	588	737	4,514	1,390	123	16,724
19. Dysentery, Amoebic	—	4	—	2	1	5	1	1	3	17
20. Dysentery, Bacillary	721	12,356	3,061	810	4,137	4,243	5,000	3,934	458	34,770
21. Filariasis ..	123	850	9	64	966	606	212	31	440	3,301
22. Madura disease ..	87	—	—	222	14	19	1	—	—	343
23. Malaria ..	—	824	18	—	40	298	41	83	91	1,395
24. Leishmaniasis ..	3,675	125,257	7,113	9,549	20,017	9,782	45,874	17,795	18,926	257,988
25. Trypanosomiasis ..	—	75	5	30	310	8	21	4	7	460
26. Yaws ..	—	—	—	75	—	—	—	—	—	75
27. Heat Stroke ..	13,303	1	3	16,508	1	—	1	1	2,863	2,681
28. Dracontiasis ..	—	1	—	2	7	16	3	—	1	30
29. Tropical Ulcer ..	518	64	10	1,275	46	21	258	17	64	2,273
30. Anthrax ..	5,185	3,114	490	14,261	1,177	90	15,131	11	3,172	42,631
31. Cerebrospinal Meningitis ..	—	—	—	—	6	—	—	—	—	6
32. Chickenpox ..	38	27	7	76	2	4	4	2	10	170
33. Dengue ..	153	3,987	551	255	570	355	1,303	438	379	7,994
34. Diphtheria ..	—	4	—	1	—	—	—	—	—	5
35. Enteric Fever ..	1	65	7	3	27	155	26	40	2	326
36. Erysipelas ..	—	43	5	5	18	50	4	64	13	202
37. Gastro Enteritis of Children ..	—	2	—	—	—	2	—	4	—	8
38. Influenza ..	76	3,818	36	507	660	5,076	399	461	1,813	12,846
39. Leprosy ..	32	3,715	1,133	1,578	3,329	2,747	852	1,592	177	15,155
40. Undulant Fever ..	45	28	16	229	14	21	32	5	5	395
41. Measles ..	—	12	—	5	22	4	6	1	1	51
42. Mumps ..	227	2,852	617	348	773	914	2,119	1,323	85	9,258
43. Pellagra ..	36	1,705	112	77	181	591	715	240	100	3,757
44. Puerperal Fever ..	—	1	—	1	—	8	—	—	—	10
45. Phlebotomus Fever	—	23	6	—	5	10	8	17	3	72
46. Pneumonia ..	320	2	—	1,234	1,350	255	1,326	1,705	—	14,045
47. Rabies ..	—	4	1	—	1	1	3	—	—	10
48. Relapsing Fever ..	—	68	50	—	19	24	31	8	87	287
49. Acute Rheumatism	320	756	9	33	227	63	211	1,309	1	2,929
50. Smallpox ..	27	124	8	10	152	3	1,032	3	33	1,412
51. Tetanus ..	15	23	—	5	5	15	7	4	3	77
52. Whooping Cough ..	7	752	163	32	224	544	831	1,639	123	4,315
53. Circulatory System	164	7,468	225	553	2,497	4,066	3,585	5,182	482	24,227
54. Respiratory System	7,790	104,871	18,525	53,333	45,854	61,938	54,033	42,996	12,263	401,653
55. Alimentary System	6,077	136,541	32,333	43,452	59,938	71,623	67,324	63,055	13,970	494,378
56. Genito - Urinary System ..	105	9,820	3,758	266	3,902	5,278	5,797	6,237	700	35,863
57. Nervous System ..	70	5,214	145	15	325	460	995	3,410	39	10,584
58. Scurvy ..	—	463	1	13	112	42	71	7	—	709
59. Diabetes ..	1	50	6	1	80	189	11	120	3	461
60. Fever of uncertain origin ..	1,071	33,322	2,703	5,821	18,842	24,944	3,788	11,421	95	102,007
61. All other diseases..	15,243	89,673	10,163	44,051	43,808	42,963	44,948	31,377	13,724	335,950
Total New Cases	99,480	948,803	186,809	361,658	300,510	569,619	510,191	368,324	134,425	3,479,819
ATTENDANCES : MEN	130,318	799,915	208,672	442,828	507,013	568,528	663,980	441,904	157,501	
WOMEN	72,720	429,409	118,569	131,929	171,269	350,321	396,683	305,028	87,625	
CHILDREN	90,091	791,499	169,477	218,893	382,135	496,729	644,564	649,143	125,963	
Total Attendances	293,129	2,020,823	496,718	793,650	1,060,417	1,369,025	1,705,227	1,399,884	371,089	
MISSIONS	—	—	—	103,501	—	46,553	75,426	—	84,862	
Grand Total	293,129	2,020,823	496,718	897,151	1,060,417	1,415,578	1,780,653	1,399,884	455,951	9,820,304